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COMMENTS ON THE COTTON SPINNERS' CONVENTION.

The annual meeting of the American Cotton Spinners' Association in Philadelphia was characterized by a number of excellent papers that were presented to it, two or more of which we wish to discuss at this time in relation to some of the points that were touched upon as noted elsewhere in the report of the proceedings.

FINE COTTON SPINNING IN THE UNITED STATES.

This subject is at all times an interesting one in the cotton manufacturing industry in its tendency toward a finer and higher-cost production in harmony with the requirements of trade, prompted by the cultivated tastes of a large buying public whose financial means enables it to gratify.

Arnold B. Sanford, the author of the paper with the above title, is as well qualified as any one in this country to discourse upon this topic from a practical standpoint as a manufacturer. It may not be known to many of the younger generation of cotton manufacturers, those entering on a business career, that it was due, very largely, to Mr. Sanford's earnest and studious efforts, and perfect familiarity with the costs of manufacture, in the framing of the cotton schedule of the customs tariff act of 1897, still in force, that there was enacted the most scientific division of rates of duty ever devised as applicable to imports of manufactures of cotton, especially those of the finer grades which, at the time, and even now require ample tariff protection against the lower labor and other items of cost of those made in Europe.

While the coarser grades of cotton goods may not stand in urgent need of the protecting care of a tariff on imports, the same can not be said of the finer grades that are giving employment to a very large number of spindles in the New England States, and to a considerable and increasing number in the Southern States. This matter, in any revision that may be made in our tariff acts, will undoubtedly receive the active attention of Northern manufacturers because of its vital relation to the success and maintenance of their business, but it is of equal importance to Southern manufacturers in their endeavors toward a higher class of production, and even to those who may prefer from choice or necessity to remain on the lower class of goods, as relieving them from the pressure of competition as would follow were all mills on the same kind of fabric.

Diversification of manufacture is the life and chief factor in the stability of our cotton industry, and the opportunity for its greatest development and activity is to be found in the production of the finer and more expensive lines of goods which require the exercise of the higher order of skill, of mind and hand. This should be encouraged and protected by national laws and public sentiment, as contributory to national wealth in which labor and trade participate, from the lowest to the highest.

The people of the United States are in a position where they can gratify their desires for fine cotton fabrics, more

so than any other on the face of the globe, and more so than at any other time in the history of our country. The per capita circulation of money to-day is 20 per cent. more than eight years ago, 40 per cent. more than it was in 1890, and nearly 70 per cent. more than in 1880. There is more spending money in hand, to-day, than was the case ten or twenty-five years ago, and with the people better employed under normal business conditions, wages higher, increase in the number of hours for recreation, and more attention given to dress and things of refinement, there is a natural demand for better and finer articles of clothing. It is not so much that of mills on the coarser grades of goods forcing the equipment of other mills up onto the finer grades, as it is the popular demand, acting like a magnet, drawing the standard of manufacture up onto a higher and more refined plane.

Much the larger portion of the fine cotton yarns used in the United States are of domestic manufacture, and less than five per cent., it may be said, is made abroad, or scarcely enough to keep employed 250,000 spindles on No. 70 yarn, the average count imported, full time of 60 hours per week. This does not include spool thread. Practically, therefore, the American manufacturer has the home market to himself for his fine yarns for woven or knitted fabrics, and he, undoubtedly, would control a larger portion if he should go onto finer counts or higher qualities than those he is already making, or such as are now imported. There are only two reasons for the importation of cotton yarn for any purpose—either there is not enough of the domestic quality to meet the demands of trade, or the specific quality is not made by our mills. It is not to be expected, nor would it be a part of fiscal wisdom in tariff legislation to effect, that all importation be stopped. For the fiscal year of 1906, there was entered for consumption of imported cotton yarn, 5,245,141 pounds at an average cost of about 63 cents a pound, duty paid. The importation of yarn, not colored or bleached, and single, for that year consisted chiefly of 30's to 40's, at a cost, duty paid, of 36 cents to $1.75 per pound; and such as was bleached, combed, etc., of two or more ply consisted chiefly of 40's, 60's, 70's, 80's and 100's at a cost, duty paid, of 50 cents to $1,00 per pound. Some yarn was imported running as high as 200's and even 300's. The counts, however, are not always indicative of quality which regulate price, that is, high counts indicate high quality, but low counts do not necessarily indicate low quality. Some yarns are imported, costing as high as $4.50 a pound, duty paid, and low count's not infrequently bring more than those that are higher.

Concerning the importation of fine yarns manufactured into goods, there are not enough of the latter to effect the market for the domestic product, but the case would be decidedly different if the American manufacturer was not favored by the best protective tariff ever enjoyed by him against foreign competition. About $102,000,000, in value, duty paid, of cotton manufactures were imported in 1907, but nearly two-thirds of this amount consisted of laces, edging, embroideries, and the like, of a quality not made to any extent in this country. Only about one-sixth of this importation was of manufactures (cloth) that could be designated as competitive, all high priced, averaging from 20 to 25 cents per square yard to the importer, and sold at a higher figure over the retail counter. Everything, all told, in the manufacture of cotton the consumption by the American people is not far from $640,000,000, of which more than five-sixth is of domestic make. We are confident that with a properly adjusted tariff, like the one we now have, on foreign imports, our manufacturers will be able to assert their competency when they feel it is worth their while to cater to a trade that consumes the special products that are now taken from foreign mills.

As brought out in Mr. Sanford's paper, fine cotton yarn spinning in the United States has been of slow growth, following the wants of consumers, and prior to 1881 was confined to a few mills, other than thread mills, using their own products in weaving. It was not until that year that successful ventures, on a large scale, were made by New England mills for furnishing the trade with such yarn, and by 1887, 60's to 100's were being spun for this purpose by a 40,000-spindle mill in Fall River, Mass. While the Northern spinning of cotton for the high counts has been developing during the last twenty or twenty-five years, Southern spinning of this character is of much more recent growth, but with equally auspicious prospects, as noted in our comments on this subject, in our last month's issue, of a North Carolina mill spinning for the trade 80's to 100's yarn of most excellent quality, as an example of a conspicuous advance in the spinning of high counts in the South on a commercial scale.

At this point, we desire particularly to ask our readers for such information, as may be deemed authentic, of which they may be possessed, concerning fine spinning in Southern mills, for historical record. According to our records, we have six mills in the South, with 102,600 spindles, on combed yarns as fine as 60's to 80's, and though we have seen it reported that even 120's have been spun, we fail to get its verification, as the product of the ring frame, or that much of it as been done as the product of the mule.

BLEACHING AND FINISHING IN THE SOUTH.

This is an important subject for the cotton industry of the South, and for this reason, J. W. Arrington's paper before the Richmond meeting of cotton manufacturers, should command attention. As Mr. Arrington says, the establishment of bleacheries is one of location more than one of natural conditions, so far as the North and the South are concerned. There is nothing insurmountable or which can not be readily overcome in the way of bleaching and finishing cotton goods in the South, attributable to any natural peculiarities of water or climate. Though the streams in the coastal region may be more or less turbid, they can readily be clarified by comparatively inexpensive methods of filtration such as are in vogue in a number of instances for drinking purposes for municipalities. There is nothing essentially deleterious in the water of the South which can not easily be eliminated for the proper bleaching and furnishing of cotton fabrics. This is especially true of the waters in the high lands or hilly regions of the Appalachian range of mountains. It, therefore, resolves itself to the matter of location or convenience in relation to mill requirements for the bleaching of the manufactured product. There must, in the first place, be a sufficient quantity of goods made in any locality for bleaching before the establishment of a neighboring bleachery can be warranted. This condition is gradually being brought about in the South, and with its extension will be seen the organization of bleaching plants until local needs will be satisfied as fully as is the case in the Northern States. There is a secondary, though an important, consideration that demands attention before bleaching can be made a

success in the South, and that is the confidence of the converter which can only be attained by the quality of the work done as the result of skillful manipulation and economical methods. The necessary skill and superintendence have to be first obtained from the older establishments in the North, and the help trained in the requirements of the business. It is a question of proper training, for there is no difficulty in securing the character of help needed, fully as intelligent as any that can be picked up in the North. But all bleacheries can not handle the same line of goods, and though some may have the facilities and class of employes necessary for taking care of sheetings, drills, ducks, etc., it does not follow, as a matter of course, that the higher or more expensive grades of goods can be cared for, equally satisfactorily. Bleacheries, therefore, become specialized the same as other occupations, and adapted to the class of manufactures upon which their patronage depends.

COTTON GOODS IN THE ORIENT.

This subject is an attractive one to many writers and audiences, and advices of all kinds have been freely given as to methods for Americans to pursue to extend their trade to foreign lands, and especially to those of the Orient. In reference to this, the paper by John Foord, will be found containing suggestions of value as coming from one who has given the matter very considerable attention as secretary of the American Asiatic Association, of New York. Mr. Foord relieves the statistical position of our exports to China for the last few years from some of its misconceptions as indicative of the real proportion of the consumptive demands of the people of that country. He states that the normal consumption in the Chinese market of plain cotton cloths, bleached and unbleached, of foreign make, does not exceed 700 million yards per annum. Coming from such a good authority it would be well to bear this in mind when export statistics are studied in their relation to one another; and when they show a decline in trade it may be more apparent than real, as noted, for example, in our exports to China for the calendar years of 1905, 1906, and 1907, which were respectively 563 million yards, 271 million yards, and 38 million yards, aggregating for three years 872 million yards, or an average of nearly 291 million yards per year from the United States alone, to which should be added the Chinese imports from other countries as Great Britain, India and Japan, totalling, for this three-year period, an excess of 200 million yards above the present capacity of consumption of that market at existing prices. The Chinese markets have been, for two or more years, endeavoring to put into consumption the extraordinary imports of 1905, which approximated 1,200 million yards of cotton cloth of British and American goods alone, the latter amounting to 563 million yards. This one year's importation exceeded the normal annual demand 500 million yards, and to this may be attributed the great falling off in our exports to the Orient since that year. The pessimism that is observed in our export cotton goods trade to-day is very largely due to the optimism of 1905—a depressing contrast. There are, undoubtedly, great opportunities for the extension of our Oriental trade in cotton fabrics, if the markets are properly cultivated with special reference to the peculiar wants of the people. But there should not be forgotten that other nations are doing all they can to aid their manufacturers in securing a good slice of this trade, and whatever we do we shall be met with well-conceived competition, and also with that of the Chinese mills themselves, which promise to be an important factor in eventually supplying the domestic demand. Mr. Foord says that "it has always been difficult to guage the potentialities of the Chinese market, ... but with the awakening of China the possibilities of the immediate future assume a new significance." Every observing mind is noting the awakening of China to her immense possibilities that have remained dormant since the beginning of time; but with this vivification of national impulse comes industrial development and the growth of manufactures contending for the home trade against foreign competition. But, as has been seen in the commercial history of all countries, the rise in the industrial development of a nation is always accompanied by greater commercial relations with the outside world to the material advantage of the latter. As noted by Mr. Foord, "to raise the standard of living in China to the average standard of the United States would be equivalent, so far as our markets are concerned, to the creation of five Americas. To raise the standard of living in China 50 per cent. would, commercially speaking, add 200,000,000 to the world's population." This is something seldom thought off, and yet the concept is of more importance to the commerce of the world than any increase in population. Raise the standard of living of the 1,000 million of semi-civilized and barbarous people of the earth, and the commercial activities of the world would be increased to incomprehensible limits. Here is a subject worthy of the earnest consideration of the votaries of both domestic and foreign commerce—raise the standard of living.

TEXTILE SCHOOLS.

Every textile manufacturer is deeply concerned in the proper education and training of those in his employ occupying positions of responsibility with the directing care of those who come into immediate touch with the product being manufactured. Every manufacturer is also as deeply concerned, consciously or unconsciously, in his own education and training, however it may have been obtained, by hard and conscientious work in the factory, alone, or in the school and factory together. Neither technical education nor training, of itself, will make a man a successful manufacturer, but the man is better prepared for such with this education or training than without it. To be successful in any vocation, the man must have in his make-up the fundamental elements of success that natural adaptation permits. Thomas Nelson in his paper on this subject, comprehensively states this position and the relation of the textile school to the factory: "We do not claim," he says, " that we can turn out these men or any of our students as full-fleged, experienced superintendents, but we do claim that a young man who has had a systematic training, who has been taught to reason the why and the wherefore, will be able to grasp and more readily comprehend the difficulties as they occur than will one who has not had this textile training." If a textile school can do this, it is all that can be expected of it, or, in fact, of any educational institution, of bettering a man for meeting the conditions of life that he is to encounter, whatever their nature or obligation may be. We believe that this is clearly understood by most manufacturers, but one is occasionally met with

who is seemingly unable to see or imagine anything beyond the limited confines of his own horizon, and is inclined to ridicule everything that does not emanate solely from the drudgery of the factory. The textile school, however, is with us and its improving effect on the industry is being felt in all of its ramifications, and upon its system of education will depend—as has already been the case to a large extent—the prosperity and elevation of our textile manufactures. The school offers facilities that can not be obtained in any one mill for one who intends to follow manufacturing. The mill offers no opportunity for becoming familiar with the mechanism and functions of more than one machine at a time, and what may be learned in this particular is the result of observation and practice without the assistance of an expert instructor acquainted with the rules of calculations for the economical operation of the parts that the inventions of the makers have introduced to increase the efficiency of the machine. The school is practical, it is also theoretical, in its course of instruction, and theory and practice are correlated.

WHITE BIRCH FOR SPOOLS.

The Forest Service of the Department of Agriculture, Washington, D. C., has issued a circular on white birch as a timber or wood for the manufacture of spools upon which to wind cotton thread, from which we take the following:

"One of the industries which deals with small things, yet, which is one of the utmost importance to the country's commerce, is the manufacture and export of spool wood. This business is peculiar to the New England States, and is centered in Maine. Spool factories of this State are now turning out eight hundred million spools annually, with a market value of nearly $1,000,000.

"The best quality of timber is used for the manufacture of spools. White birch, which is used almost exclusively for this industry, reaches the factory in the form of bars from ½ to 2 9-16 inches square, and from 2½ to 4 feet long. These bars must be absolutely clear. The birch is cut in winter and sawed in small portable mills which operate near some railroad line, about 2 1-3 cords being required for 1,000 feet of bars. After sawing, the bars are piled criss-cross, in order to facilitate thorough seasoning, and protected from the weather, are allowed to season until June. The spool bar mills in Maine turn out about 15 million feet of bars during the year and approximately the same amount of material is manufactured into spools in the State.

"The machines for making spools are complicated and require skilled men for their operation. The spools drop from the lathe at the rate of one per second, and must be perfectly uniform and true. The finished spools are marketed in this country largely in Rhode Island, Connecticut, New York and New Jersey, while the spool bars are largely exported to Greenock and Glasgow, Scotland, and to Hull and Fleetwood, England. Shipments to these points are made mostly from Bangor, as much as eight million feet having been sent from that port in a season."

In response to a request from us for further information on this subject, the department writes us that white birch is probably not used to any greater extent than for speels for winding thread, and the principal woods for loom shuttles etc., being dogwood and persimmon, which are better fitted by reason of their great hardness and density of fiber.

"The white birch of which most spools are made is the paper or gray birch of the New England States and does not grow in the Southern Appalachians. Two species, the river and sweet birch are found in the South, however. The wood of these is rather strong, hard, tough, close-grained, and light brown with pale sapwood. That of the sweet birch is used for furniture and fuel, and of river birch for furniture, wooden ware, wooden shoes and turnery. Neither attain large size nor are they found in commercial quantities."

COTTON MILLS IN MEXICO.

The greater number of the cotton mills of Mexico are of modern construction and patterned largely after the mills of the United States and Continental Europe. As regards equipment, not only the mills of Orizaba, but practically all the cotton mills in Mexico, are now equipped with modern machinery. Many of the mills have recently abandoned their old machinery for that of later and more modern design, so that it may be safely stated that practically all the cotton mills in the Republic are modern in equipment.

The United States furnishes about one-third of the machinery used in Mexico in the manufacture of cotton goods, the remaining two-thirds, as now employed, coming from England and Germany. The bleaching, dyeing, and printing establishments are usually of modern construction and equipped with all up-to-date appliances. Motive power is supplied by steam, water, and electricity. Steam is very largely used, but owing to the extension of electric power in nearly every portion of the country, electricity is coming more and more into general use and is gradually supplanting steam and water as a motive power for cotton manufacturing.

NO REASON FOR DISCOURAGEMENT.

Commenting on a recently published statement that the mills about Gaffney, S. C., were to close down, a well known manufacturer is quoted as saying: "None of the mills of Gaffney were represented at the Spartanburg meeting, and I have no idea that a single mill in this county agreed to shut down. "Why," continued he, "our fiscal year ends in May and it has been the most prosperous year that my mill has had since it has been in existence, except one, and while the demand for cotton goods is nothing like as strong as the mill people would like to see, yet to me the situation does not appear nearly as hopeless and as discouraging as it was a few years ago when the mills had such a hard time. I see no cause for serious alarm over the situation."

WELFARE WORK IN MILLS IN PIEDMONT SECTION.

A number of mills in the Piedmont section have been considering the advisability of establishing welfare work in the mill villages. At least two of the number have already commenced the establishment, and within a few weeks, it is said, welfare work will be in complete control of these villages. These mills are the Piedmont Mills, at Piedmont, and the Monaghan Mills, at Greenville.

Greensboro, N. C., has 337 cotton mills within 100 miles of the city. Capital invested, $133,720,000, and operating about 4,160,932 spindles, giving employment to 88,400 operators.

American Cotton Manufacturers' Association.

Municipal Seal

The annual convention of this association was held May 20-21, at Richmond, Virginia, the meetings being held in the auditorium of the Jefferson Hotel. The delegates were the guests of the commercial interests of the city and were received by a reception committee composed of one hundred business men representing the Chamber of Commerce, Business Men's Club, Traveler's Protective Association, and Retail Merchants' Association. The official badge of the members of the association was a leatherette bearing a picture of the Washington Monument as its emblem and the dates and place of the meeting. This insignia admitted the members to every entertainment, and was distinctive of their mission.

THE JEFFERSON, RICHMOND, VA., HEADQUARTERS OF THE AMERICAN COTTON MANUFACTURERS' ASSOCIATION.

The first day's session was called to order by President S. B. Tanner, and was devoted chiefly to oratory and social greetings, and, to some extent, to the reading of technical papers. The delegates were welcomed to the state by Governor Claude A. Swanson, and to the city by Mayor Carlton McCarthy; a welcome being also extended on the part of the Chamber of Commerce and commercial interests by S. Dabney Crenshaw. Ex-President Arthur H. Lowe replied to the several addresses of welcome, who was followed by President Tanner with his annual address, an abstract of which appears elsewhere in these columns. The following papers were then read, abstracts of some of which appear elsewhere:

"Inland Waterways," by Hon. John H. Small, Member of Congress from North Carolina; "Cotton Goods in the Orient," by John Ford, New York; "Fine Cotton Spinning in the United States," by Arnold B. Sanford, Boston, Mass.; "The Advantages and Disadvantages of Bleaching and Finishing in the South," by John W. Arrington, Greenville, S. C.; "Sizing Yarns," by E. W. Hitchcock, Boston, Mass., and "Modern Methods of Merchandising," by L. R. Latshaw, Philadelphia, Pa.

The afternoon of this day was given entirely to business exclusively for active members, and the evening was given to a "smoker."

The second day's session was opened with President Tanner in the chair, and the time was given listening to the following papers, abstracts of many of which are to be found elsewhere in this issue: "The Tariff and the Currency," by D. A. Tompkins, Charlotte, N. C.; "The Oil Storage Problem," by S. B. Bechtel, Ft. Wayne, Indiana; "A Misnomer," by W. H. Harriss, Atlanta, Georgia; "Textile Schools," by Thomas Nelson, Raleigh, N. C.; and, "What the South has to Gain from Yarn Testing," by R. B. Hoguet, New York.

At the end of the morning session a business meeting was held at which active members only were present.

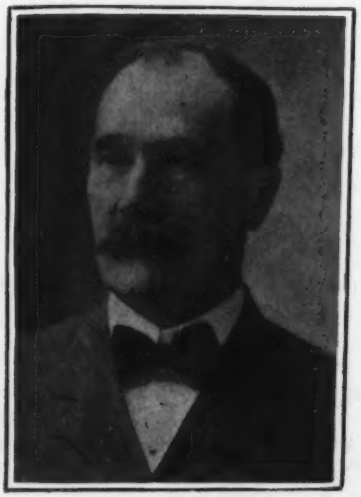
The afternoon of the second day was devoted to recreations, the principal one of which was a luncheon at the Lakeside Country Club, given by the business interests of Richmond.

PRESIDENT T. H. RENNIE.

In the evening an address by Governor John A. Johnson, of Minnesota, was listened to.

The committee appointed to report on cotton exchanges, of which E. A. Smythe was chairman, expressed their hearty commendation and approval of the recent report made by Herbert Knox Smith, of the Bureau of Corporations, Department of Commerce and Labor, Washington, D. C., with reference to the question of cotton exchanges. The committee reaffirms the position taken by the association at its Asheville meeting in 1906, and recommended the following:

"In addition to the recommendations of the association of 1906, your committee urge that the exchanges further modify their contracts so as to make provision for the following requirements:



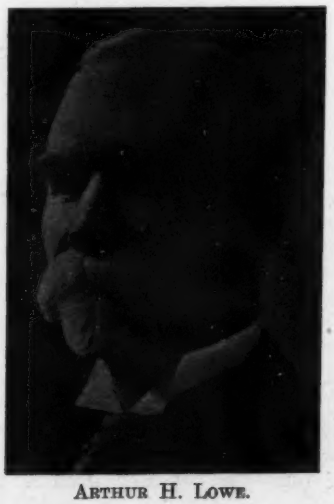
S. B. TANNER.

SECRETARY C. B. BRYANT.

"Where cotton is certificated by the exchange no certificate for a lot of 100 bales should be allowed to contain grades variant more than two grades. In other words, a certificate of cotton should not be allowed to contain grades more than one grade below middling and one grade above low middling, or one grade below middling and one grade above middling. In other words, the maximum variation of any certificate should be two grades.

"The committee feels that there may be made a further limitation by both the New Orleans and New York exchanges upon the quality of cotton to be deliverable upon any contract, and feels that the recommendations made by the association in 1906 represent the maximum variation which should be permitted in grades delivered on contract.

"It is essential, for a contract to be of real value, that it should be responsive to spot conditions. The contracts have been far from responsive to spot conditions on the New York exchange for several years, and not wholly responsive even on the New Orleans exchange. To make spot quotations and contract quotations the same, your committee feels that some option should be given to the buyer to require delivery to him of cotton of specific grade, and therefore recommends a third provision, as follows:



ARTHUR H. LOWE.

"That at a reasonable time before tender date, the buyer may give notice that he will require the delivery to him of the grade average middling, nothing below low middling, nothing above good middling, and for such option, he should be required to pay a reasonable excess over contract price, say one-quarter cent per pound.

"If it be contended that such a requirement would tend to manipulation in making it practicable for buyers to squeeze sellers, then your committee feel that a further provision would wholly eliminate this possibility, namely: that a provision should be made for the certification of cotton in standard warehouses in the cotton producing States, and that delivery may be made on contracts of cotton in these standard warehouses, with a proper allowance of freight to the exchange point.

"It may be said in this connection that low prices of cotton, as also great variance in prices, in any season are altogether as much to the detriment of the spinner as they are to the planter himself. What is desired by both parties is a fair value to the commodity, allowing to the producer a fair profit in the raising and fixing in some measure a stable price upon which the spinner can calculate in making his sales. These two results can not be secured under present conditions on the exchanges, and particularly on the New York exchange, and your committee does not feel that it can conclude its report without expressing its disapproval of the contract of the New York exchange, and a sincere hope that the leaders on the New York exchange will realize the defects of their contract and sincerely attempt to remedy the same. Under present conditions, the contract on the New York exchange can be of value only to the speculator. It is not to the producer or to the manufacturer. It should be clearly borne in mind that the great mass of buyers of goods, particularly buyers for export, base their ideas of the value of goods upon contract quotations on the New York exchange, and that these buyers are wholly misled therefore as to the cost of the raw material to the manufacturer. Being thus misled, it makes a constant effort on their part to secure prices on the manufactured article, which are below what the manufacturer can possibly sell at. Under such circumstances, erroneous market quotations become a curse to the manufacturer as to the producer, and we feel that the New York exchange must rectify its contract so as to make the contract responsive to the spot condition."

The association adopted a resolution proposed by the committee on resolutions, that each past president of the association be made an ex-officio member of the board of governors. A resolution creating an office of historian to keep the records of the association was approved.

A resolution urging Congress to pass the house bill providing for the purchase of forest lands in the southern Appalachian and White Mountains, and looking to a co-operation of the government and the people in the preservation of forests, received approval.

OFFICERS FOR 1908-1909.

President, T. H. Rennie, Pell City, Ala,; vice-president, Lewis W. Parker, Greenville, S. C.; chairman Board of Governors, T. Ashby Blythe, Philadelphia; secretary and treasurer, C. B. Bryant, Charlotte, N. C. New members of the Board of Governors: Charles K. Oliver, Baltimore; Aug. W. Smith, Spartanburg, S. C.; C. B. Amory, Boston, and John C. Rankin, of Lowell, N. C.; historian, D. A. Tompkins, Charlotte.

ANNUAL ADDRESS OF PRESIDENT S. B. TANNER.

Improvements have been continued during the past year as in the years preceding, along the line of betterments and welfare work for the employes. The Southern States have better common school facilities and longer terms, to which the mills generally subscribe liberally. The age limit has been voluntarily increased by the mills, as well as a reduction in the hours of labor. In addition to this, the manufacturing States, North and South, have one or more textile schools. North Carolina has two industrial schools, one at Charlotte and one at Spray, for cotton mill employes, where they can attend school and work in the mills a portion of the time, and some of them also learn farming and other kinds of outdoor work. It is gratifying to note that the school attendance is rapidly increasing each year. All of the mill villages are well supplied with churches and Sunday-schools; some of the Sunday-schools have over 500 pupils. A great many mills have erected Y. M. C. A. buildings, gymnasiums, libraries and graded schools.

A considerable increase in the wages of employes was made during the prosperous period, but it is a regretable fact that they did not generally appreciate it properly. A large part of the employes in cotton mills and in some other lines, were indifferent or would refuse to perform the same amount of labor for the increased pay, and in addition to this they would refuse, in many cases, to work more than four to five days per week, or only as necessity demanded, as they received as much for this service as they had been receiving for six days before the advance, and spent much time migrating from one mill to another. This, of course, caused a shortage of labor and stoppage of machinery at a time when there was a great demand for merchandise at good prices, which resulted in greatly decreased earnings for both the mills and the employes, and making it necessary for the mills to incur considerable expense in sending to the mountains and remote places in this country, and also to foreign countries for help, which would have been unnecessary if they had put in full time, which was plainly demonstrated about the time the panic started and before the curtailment began.

The cancellations, and attempts to cancel contracts, have caused no end of dissatisfaction and severe losses in some cases during the last six months, and we have had numerous requests to formulate and adopt a form of contract which will be uniform, and binding upon all parties concerned, without question, so as to avoid such methods in the future. A committee was appointed at our last meeting to do this work and it will no doubt have the proper attention. A committee was appointed also to confer with a committee from the Cotton Exchanges to agree, if possible, upon some equitable basis for placing contracts and assuring the actual delivery of spinable grades of cotton at different points in the North and South, which would be a great convenience for the mills. It is to be hoped that something can be done, as the present methods are very unsatisfactory.

While the volume and character of the business of the country has been enormously changing, our tariff system has remained absolutely unchanged. Industries have been revolutionized, and yet the tariffs have remained identical since the Dingley Act, so that to-day an improved and enlarged

industry is suffering severely from the necessity of working under a tariff which is obsolete in respect to the rates of duty, and obsolete in respect to the fact that there is no way to change one item except by upsetting the whole list.

We have reached the time when our domestic markets are not sufficient to absorb our manufactured products. The national congress is naturally charged with the control of all matters relating to foreign trade. The industrial interests of this country require that we must get part of the trade of foreign countries. It seems to be generally conceded that the way to do this is to create a merchant marine. The American merchant marine is to-day practically nothing. Subsidized ships come to this country to take away our raw materials and our food products, but they will never come for the purpose of taking away our manufactured goods. The prosperity of those engaged in the production of raw materials and food stuffs in this country is very largely dependent upon the manufacturing development. Therefore, both the farmer and the manufacturer are immensely interested in the development of foreign markets for American manufactured products, as well as American raw materials and food stouffs.

INLAND WATERWAYS—BY HON. JOHN H. SMALL, M. C., NORTH CAROLINA.

There is a woeful degree of ignorance upon the extent of our natural resources, our profligate waste in exploiting them and the rapidity of their exhaustion. Waterways and their improvement directly involve the subject of transportation. In all ages this has been an important problem, but in these modern times it has become even more essential to civilization and progress. No community, no section, no State and no country can in these times live unto itself alone. No industry can thrive upon itself. The interchange of products is essential to the prosperity of all the producers. The farmer without the means of forwarding his produce to the nearest and best market is seriously handicapped. The manufacturer may have all the other elements at hand, such as nearness to the raw material, abundant and skilled labor and cheap power, but his business is doomed to failure unless he has transportation.

HON. JOHN H. SMALL, M. C.

As a fair comparison it may be stated that the average cost of water transportation is about one-fifth the average cost by rail. It is now universally recognized in all commercial countries that improved water routes furnish the cheapest and most convenient method of transportation for large masses of bulky freight, in the movement of which the time consumed is not vital.

Expenditures in the judicious improvement of waterways and the construction of canals do not constitute a loss or a drain upon our resources, but they are investments which are distinctly remunerative and profitable. Whatever promotes the welfare of the Mississippi Valley, whatever enlarges the markets and brings prosperity to the Agricultural Gulf States, whatever favors the commerce of the already prosperous States of the Pacific Coast, whatever renews and quickens the transportation facilities of the States of the Atlantic Seaboard, each and all are matters of national concern.

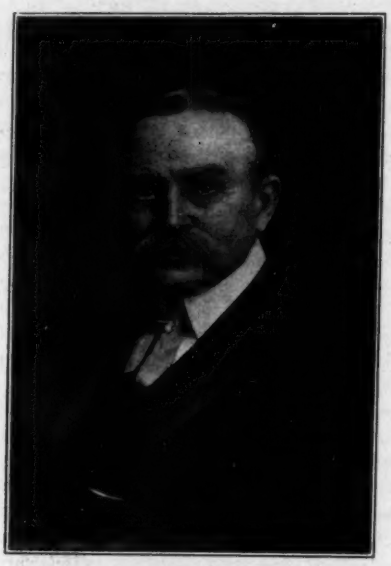
It is now concededly the duty of the United States to undertake this great work of providing additional waterways. There is scarcely any part of our commerce which is not directly or indirectly interstate. It is indeed a very small and insignificant industry, the products of which are distribution only within the State of its location. There are two conditions absolutely necessary for the proper use of our rivers, either for purpose of navigation or in the utilization of water power. These are the necessity of regularity in the flow of water, and second, the necessity of preventing the movement of silt and rubbish from the water sheds into the rivers below. These two necessary conditions can only be maintained by the preservation of the forests and forest covering. As long as the forests are preserved the mountains constitute the great reservoirs which hold the rainfall and send it gradually into the streams below. If the mountain forests are denuded this forest covering soon disappears, and the rainfall rushes down the water sheds, carrying away the soil, overflowing the banks of the streams below, depositing silt upon fertile meadows, damaging or destroying water-power plants, creating alternate flood and drought, and ultimately depositing silt and rubbish in the navigable streams below. The only remedy is to stop the work of deforestation, so ruthlessly pursued, and the only practicable method of doing so is the establishment of forest reserves in the White Mountains and in the Southern Appalachian Range.

COTTON GOODS IN THE ORIENT—BY JOHN FOORD, SECRETARY AMERICAN ASIATIC ASSOCIATION, NEW YORK.

If regard be had merely to the statistics of exports, we should be driven to the conclusion that the market for American cotton textiles in the far East is disappearing. For the calendar year, 1905, we exported to China 563 million yards of cotton cloth valued at $33,514,818; for 1906, the quantity was 271 million yards valued at $16,704,823; while in 1907, the quantity dropped to 38 million yards valued at $2,678,528. The proportion borne by the Chinese demand to our entire export trade in cotton textile was 70 per cent. in 1905, 52 per cent. in 1906 and 18 per cent. in 1907. But the real proportions of demand for consumption are not at all reflected in the export statistics. What may be called the normal consumption in the Chinese market of plain cotton cloths, bleached and unbleached, of foreign make, does not exceed 700 million yards per annum. But in 1905 the combined English and American export of these fabrics amounted to 1,165 million yards. In addition to this India and Japan contributed at least 56

million yards. Here was an obvious excess over actual requirements of fully 520 million yards. In the following year, the excess was less marked, and in 1907, the English export was cut in two while ours almost disappeared. But the total for three years was, nevertheless, at least 200 million yards in excess of the highest estimate that can be placed on the present capacity of the Chinese market to absorb plain cotton cloths of foreign manufacture at existing prices.

The virtual cessation of demand from the Chinese market for American cotton textiles during the last eighteen months is thus merely the natural result of the too confident optimism of 1905 as reflected in the suddenly inflated exports of that year and the first half of 1906. It is true that American trade has suffered a good deal more than the English from the overstocking of the market for cotton piece goods, but this is largely due to the fact that it was on the rapid recovery of the consuming markets in North China that the faith of the native dealers in the proportions of the future demand was based.



JOHN FOORD.

Of course, Japanese competition has had its effect in producing a diminished demand for American cotton in Manchuria. A Japanese syndicate has been at work there, with all the advantages that cheap freights, use of government money at 4 per cent., and a stable rate of exchange secured by the use of Japanese currency, could give it. According to a native Japanese newspaper the relative position of Japanese and American cottons in the Manchurian market has been reversed, and the product of Osaka mills had been for eight months coming into Southern Manchuria at the rate of a million and a half yards a month. Considering the productive capacity of Japan, this is a fairly large trade, but whether it represents a competition which is likely to keep on growing, belongs to the realm of conjecture.

On the other side of the account, there is some evidence that the markets of Southern and Central China, heretofore all but monopolized by English goods, are being invaded by the lighter weights of American cloth. There have been scattering sales, some of them of considerable amount, made in this field during the last eight years, but it is only recently that indications have been forthcoming of a permanent lodgment for American textiles having been effected there.

If past experience may be taken as a guide there is every reason to be hopeful of the future. Twenty years ago our interest in the cotton piece goods trade with China was very slight being with the exception of one or two qualities of standard drills, confined to the export of surplus domestic goods which were, for the most part, of too high a standard of quality for general Chinese use. It has always been difficult to gauge the potentialities of the Chinese market and it can not be said that new conditions make it any easier. But with the awakening of China the possibilities of the immediate future assume a new significance. As Judge Wilfley has remarked, this awakening is a fact of world-wide importance, because to raise the standard of living in China to the average standard of the United States would be equivalent, so far as our markets are concerned, to the creation of five Americas. To raise the standard of living in China 50 per cent. would, commercially speaking, add 200,000,000 to the world's population.

In regard to the unbounded natural wealth of China, German geologists have calculated that the coal deposit in only one province of China is sufficient to supply the consumption of the world for two thousand years; that there are gold and silver mines in abundance, and that material development is all that is required to make China one of the wealthiest nations in the world. If the purchasing power of every Chinese should be increased by only ten cents per annum the ability to purchase foreign products, of which the most necessary and the most generally desired are the products of your cotton looms, would be increased by $40,000,000.

So far as the relations between the two countries are concerned, the United States was probably never in a better position to cultivate commercial relations with China on a basis of mutual respect and confidence. There certainly never has been a time in the history of the intercourse between the Chinese Empire and this Republic when there were so few matters of controversy requiring diplomatic treatment, or when each was so thoroughly impressed with the desirability of cultivating the friendship of the other. The proposed return of about half of the amount of the indemnity exacted after the Boxer troubles, can hardly fail to impress the Chinese mind with a high respect for the American sense of justice. There are millions of dollars worth of trade hanging on a turn of a fraction of a cent, and not a large fraction at that. It is like the few feet of elevation which changed, in historic times, the direction of the flow of our great continental river and gave a new turn to the development of North America.

Here is the natural place of education for the young Chinamen who will, but a few years hence, be in control of the destinies of their country. But, while knowing and appreciating that fact, the higher classes in China shrink from sending their sons to American schools and colleges, because of the absurd difficulties which our laws have placed in the way of their admission. The English are wiser in their generation than we are in this matter, and have formed an organization for the special purpose of facilitating the coming of Chinese students to their shores.

FINE COTTON SPINNING IN THE UNITED STATES—ARNOLD B. SANFORD, PRESIDENT AMERICAN COTTON YARN EXCHANGE, BOSTON.

Ten years ago I had the pleasure of presenting to our association in Charlotte, N. C., a paper on fine cotton yarns. At that time there were not over 20,000 spindles producing forty's to sixty's yarn in the Southern States for the trade.

The obstacles to the successful manufacturing of fine combed yarns in the South have been unskilled labor and climatic conditions. The latter has been solved by the scientific processes of humidification, so that the atmospheric conditions can now be kept under most excellent control, and the desired humidity obtained which is vitally necessary for the production of fine yarns.

The other obstacle—unskilled labor—still remains a very serious problem for our Southern manufacturers to confront, and from my own close personal investigation I feel safe in saying that there are very few locations in the Southern States where skilled labor can be had. This will be the chief trouble and hindrance for some years to come.

ARNOLD B. SANFORD.

The New England States, as you will observe, have been many years in reaching their present condition in fine cotton manufacturing. Prior to the year 1880, there was only a very limited quantity of fine cotton yarns above forty's produced in the United States. The bulk of the supply was imported from England. There were a few mills that were spinning fine counts, but principally for their own consumption and weaving, among them being the Lonsdale Company of Rhode Island, incorporated in 1834; the Wamsutta Mills, of New Bedford, 1848; and two concerns making fine yarns for thread—the Hadley Company of Holyoke, Mass., 1865; and the J. & P. Coates Company of Rhode Island, 1868.

The first corporations to enter the field on a large scale to furnish yarns for domestic consumers were the Arlington Mills, of Lawrence, Mass., and the Globe Yarn Mills, of Fall River, each building a mill for this purpose in 1881. Success following the venture, the Globe Mills, in 1887, equipped one of the finest and largest mills of that time, of 40,000 spindles, especially for the fine counts from 60's to 100's. The spinning of these No. 100 yarns by the Globe created immense wide-spread interest.

Yarn No. 100 at that time was being imported and sold at $1.50 per pound, for cops. Inside of twelve months after the Globe had begun to put its production upon the market, the price fell to $1.10 per pound, showing that home competition was in favor of the domestic consumer of 40 cents per pound, and proving conclusively that protection to our home industries was at that time and is today a direct benefit to domestic users.

For the year 1900, the United States Bureau of the Census of Manufacturers gives the total production of yarns, 41's and finer, as manufactured in the Southern States, 886,200 lbs., which, if we figure on the basis of 50's, 7-10 of a pound per spindle per week, would require about 25,000 spindles to produce.

Statistics from the same reliable source give for the year ending June, 1905, for the Southern States, 17,858,453 lbs., which requires on the same basis as above 500,000 spindles to produce, showing the remarkable increase from 1900 to 1905. Of this total, a conservative estimate would show that not over 25 per cent. of this production was combed quality.

For the year ending June, 1905, the census returns gave the total of yarns made, No. 41's and finer, as 101,253,957 lbs. for the New England States alone, which would take to produce, based on 70's, 4-10 lb. per spindle weekly, an aggregate of 5,500,000 spindles. It is interesting to note, in this connection, that in the city of New Bedford, Mass., out of a total of 2,000,000 spindles, fully 1,600,000 are on fine counts.

There is ample room for expansion in the United States for the fine cotton spinning industry, both in cotton goods and yarns, when one takes into consideration the large importations of cotton goods. For the year ending June, 1907, there were imported cotton manufactures to the value of $75,948,134. About $21,500,000 can be placed to the importations of fine cotton cloths, cotton yarns, threads and other goods. For the year ending June, 1905, the total production of fine cotton yarns and goods No. 41's and above is given by the U. S. Census Report as 123,747,455 lbs.. which would represent in yarns a value of about $60,000,000, requiring fully 6,500.000 spindles for their production. So you will see if we import $21,500,000 worth of these cotton cloths and yarns for our home consumption, then we would require, if we could have all of this trade for our domestic spinners, fully an increase of 33 1-3 per cent. in spinning spindles to meet the demand of our home consumers. Consequently at the present time there is room in this country for a large increase in fine spinning, an increase that should not stop until we can take care of the demands for our own consumption in the United States.

For the year 1900 the production on fine numbers was about as follows:

New England Mills produced about 93 per cent. of all the yarns of that class.

Middle States produced about 6 per cent. of all the yarns of that class.

Southern States produced barely 1 per cent., and all from the single State of North Carolina.

The report for the year ending 1905, shows fine spinning in the Southern States now producing 14 per cent. of the total quantity produced in the United States. Yet these facts do not prove that the fine spinning of the country is about to be transferred to the South, for the increase in the single State of Massachusetts, alone, from 1900 to 1905 exceeded the entire amount reported to the Census Bureau from the Southern States. The United States Census reports for the year ending June 1905, give returns of spindles producing 41's and above as 6,000,000; the New England States 5,500,000 spindles, and the Southern States 500,000 spindles.

This data, which I have most carefully compiled, shows that from the years 1880 to 1905 a decided movement towards finer goods was made, and this movement is still in progress in the United States.

THE ADVANTAGES AND DISADVANTAGES OF BLEACHING AND FINISHING IN THE SOUTH—BY JNO. W. ARRINGTON, PRESIDENT UNION BLEACHING AND FINISHING CO., GREENVILLE, S. C.

Until something like the last fifteen years practically the entire product of Southern looms consisted of coarse, heavy fabrics, a large percentage of them for export and only a small proportion of them being finished. When convertible goods of print cloth yarns and finer became a sufficient factor of Southern production to be appreciable the need was felt for finishing them where made and it was not long before this want was supplied.

JOHN W. ARRINGTON.

The non-success of some of our predecessors is a fact well known to the trade, which fact we think may be attributable to two causes: the difficulty of securing and maintaining competent management on the practical end of the business and the further fact that they may have tried to accomplish in their infancy a large variety and high grade of work such as had taken their Eastern competitors a generation or more to reach. The argument most frequently heard in the past against the South as a place for finishing is that the water is not good. Such argument is without foundation, in fact. The water generally throughout the South is all right, I believe, but certainly it is in that mountain section of it with which I am familiar.

When cotton manufacturing was in its infancy in the South it was found necessary to import from some older section, viz: New England, men who had expert practical knowledge of manufacturing, by whom our untrained help could be taught. In this business we have found a similar course to be necessary, our superintendents and men in charge of departments having all come from the best New England plants, each of them an expert in his line. Our own people are intelligent and willing workers. It is not hard to understand, therefore, that such a combination should produce results that are most gratifying.

The first essential to the success of such a business is to obtain the confidence of the converter, that the quality of the work will be satisfactory. Probably every finishing works, no matter where located, has to go through this process of proving their right to exist, which process might well be termed the formative period. During such a period almost all shipments are of small sample lots, involving a disproportionate cost per yard for finishing. By far the greatest advantage to the South in this line is the matter of location, meaning thereby the question of favorable freight arrangements obtainable on gray goods purchases, which favorable arrangements are not available if the goods are shipped to Eastern finishing works.

Before there was a bleachery in the South and every yard of the goods had to go to New England to be finished, it was necessary for the Southern mill to deliver its gray goods to Eastern bleachery points in order to compete with the Eastern mill located right at the doors of the bleachery. They would as soon allow that freight to the buyer as to pay it to the transportation companies.

A few years ago when labor legislation was unknown in the South and when manufacturing had not developed so as to cause any scarcity of labor, the hours of work were far longer and the rate of pay smaller in the Southern cotton mills than in those of the East, which gave the Southern mills a so much lower cost as to threaten the industry in New England on coarse yarns and heavy fabrics. The result of this difference was to drive New England into changing over as rapidly as possible to finer counts of yarn, or where that was impracticable with old established plants, to force them into building additional large and up-to-date plants in the South, which course a number of them followed. As to hours of work and rate of pay, conditions in most of the Southern States have been undergoing a change in the last few years to a greater extent than in New England, so that to-day while there may still be some advantage to the Southern mill it is so slight as to be said not to exist and is probably fully offset by the greater skill of the Eastern operative, due to longer training. We take the ground, however, that such changes in conditions do not apply to finishing works for the reason that our advantage is one of location, of which we can not be deprived and which can not be altered. In short, it will always be to the benefit of the owner of the goods to finish them where made, rather than to haul them a thousand miles or more to finish, and then a still greater distance to final destination.

The process of singeing by means of a gas flame is of comparatively recent origin, having as yet not reached its century mark.

A MISNOMER BY WM. H. HARRISS, MANAGER CARHARDT COTTON MILLS, BELLEVUE MILLS CO.

Very probably we have all at times heard the expression—"a cotton mill in a cotton field," as applied to many of our Southern cotton mills. It will be my purpose to try and show that in truth the expression is a misnomer, and furthermore, that we Southern cotton manufacturers are not taking full advantage of the one great opportunity offered by the South to the cotton spinner.

I doubt in my own mind if the cotton mills in the Southern States to-day have a single decided advantage over those of England or New England. In fact, I have at times thought that at this particular period, or stage of development of the industry, the world over, England has the balance of power in her favor. Certain is it that she has two distinct advantages, namely: low initial cost of plant construction and equipment and more efficient labor at a lower price. The subject of advantage in securing

WILLIAM H. HARRIS.

raw material is yet a mooted question, and one laden with many good arguments on either side. It would appear that in some cases the mere presence of an abundant supply of raw material in many Southern mill doors has worked to the detriment of the profit sheet; in view of the fact that such a situation is inclined to cause the manager to form an "opinion" of the general market trend, based on local conditions. We all know that that an "opinion" of the cotton market when we have goods sold and cotton to buy is sometimes a very dangerous thing to possess. The Englishman is not bewitched by these local conditions, and we often awake to the realization of the fact that he has secured his supply of better cotton at a better price and our one great supposed advantage in raw material is lost in the awakening. Such instances would seem to show that "a cotton mill in a cotton field," as exists to-day, in name only, and with the implied advantage of no real benefit to the manufacturer.

Let us see for comparison what the relative costs are in manufacturing raw cotton into goods. Take for example an average size mill on medium brown cotton sheetings or drills, which includes a great portion of our mills, and the division of total cost will be about as given below. The items vary of course with conditions and circumstances, but for our purpose here, the following will be about right, 100 per cent. representing total cost:

A. Productive and non-productive labor—total labor cost .....25 per cent.

B. Starch, supplies, oils, light, heat, power, repairs, etc.—total milling cost .....10 per cent.

C. Salaries, insurance, taxes, interest, depression, general and incidental expenses, etc.—total fixed cost .....15 per cent.

D. Cotton, including waste—total raw material 50 per cent.

Total cost to manufacture.....100 per cent.

The items A, B, and C, which represent about one-half of the total cost of producing cotton cloth, are practically fixed. While it is true that item C embraces what are generally termed "fixed charges," yet in a relative sense items A and B are also fixed within narrow limits. These first three items vary of course with local conditions as to labor and fuel, together with organization arrangements and general economic supervision. However, in the same mill they should not change outside of a range of 10 per cent. from year to year.

How different though is the last item of cost, D—raw material. It representing alone the other one-half of the total cost, a fluctuation in the price of cotton over night can often offset the advantage gained by the economic handling of all the first three items combined. Herein lies the cause in my opinion of more mill failures than all others that might be suggested. Then again we at times see old mills, of the most antiquated equipment and plant arrangements, outstrip in profit-showing its more modern neighbor, solely on account of luck or foresight, as the case may be, in purchasing raw material. Strike the market wrong, which is more often the case, they go to the wall very rapidly on account of the physical handicap.

So long as a mill is properly organized, with ample working capital, properly equipped with modern machinery apparatus and properly managed, the cost of the first three items are as stated practically fixed. Now the South offers opportunities for fixing the cost of raw material within narrow limits that are not found in any other of the great cotton manufacturing sections of the world; yet we are not making the best of our only real advantage over foreign competition. Once fix the price of raw material and the Southern mill man would foretell very closely what a certain piece of cloth will cost to manufacture next year or the year after if necessary. Do this and our manufacturers of the Southern States can speak prophetically of spinning the greater portion of our crop with a surer chance of fulfillment.

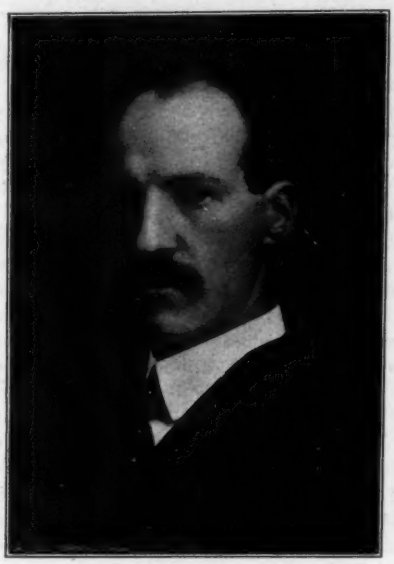
How then is the price of our raw material to be fixed? The answer in my opinion is to, in reality, put "a cotton mill in a cotton field." That is, to have farming and spinning corporations raise their own seed cotton, as well as manufacture it into goods hard by, with the cotton gin as the first process in the mill. I will say that primarily this entire discussion applies only to the smaller mills of say 10,000 spindles and under, owing to the unwieldy size of a farm necessary to raise sufficient cotton for the larger mills.

TEXTILE SCHOOLS—BY THOMAS NELSON, DIRECTOR TEXTILE DEPARTMENT A. & M. COLLEGE, RALEIGH, N. C.

It is only about 17 years ago since the first regular textile school was organized in this country, so that this is practicaly what might be termed a new departure. Since that time, however, a number of other textile schools have been organized and are in full working order in different parts of the country, both North and South. These textile schools are here, but whether they will measure up to the requirements expected of them or not, will depend to a great extent on the manufacturers themselves.

The bond of co-operation between the mill and the textile school is not as close as it should be, and I believe that this lack of co-operation is due to indifference on the part of the mill management, to wrong impressions as to what textile schools really accomplish and also to prejudice on the part of those who have not had any textile training.

If a young man would keep abreast of his fellows he



THOMAS NELSON.

must have a skillful and systematic training. This is true of any branch of industry. It is especialy true in the study of textiles. Take for example a young man who expects to make the mill business his profession. He enters a textile school and can devote his whole time to the study of textiles, or if he so desires, can devote a certain portion of his time to freehand drawing, wood work, forge work, lathe work in the machine shop, electricity, steam and steam engines, boilers, etc., all of which tend to make him a well-rounded mill man. The student is guided in his studies systematically so as to get the best results from his work. He is also taught to observe results.

Take an example. A young man is working in the mill. He is bright, energetic and ambitious, but is limited practically to the machinery on which he is working. He can not take a machine to pieces to examine it, for a mill is not a philanthropic institution; neither is it a textile school, and the result is: it takes him quite a time to master thoroughly the details. And on it goes. He may be put on some other machine and eventually master that, and so on until the young man, after many years of patient study and hard work will find himself near the top of the ladder. All honor to these stalwarts who, by their perserverance and energy, have advanced from the bottom of the ladder to the top. But see the cost. Notice the loss of time. If that same young man could have had the advantage of a systematic training, what a considerable amount of time could have been saved. Truly, knowledge is economy and time is money.

There are many bright young men about every mill who desire to learn the problems involved in cotton manufacturing, but whose ambitions become dwarfed because of their inability to find any one to assist them, and also because their sphere is very limited. Would it not be advantageous to manufacturers to select a few of these young men and send them to a textile school where they can receive textile training?

We do not claim that we can turn out these men or any of our students as full-fledged, experienced superintendents, but we do claim that a young man who has had a systematic training, who has been taught to reason the why and the wherefore, will be able to grasp and more readily comprehend the difficulties as they occur than will one who has not had this textile training. A textile student who has had a systematic course of training and is intelligent and bright, will very soon adapt himself to circumstances after beginning his practical career in the mill.

Many of the productions of these foreign mills are used as samples to be duplicated by mills in this country. This is not as it should be. Our manufacturers should not be followers but ought to be leaders. Why is it that the artistic skill in imported goods is so developed that there is a ready demand for them often in preference to domestic goods? I believe that the extensivenes and thoroughness of the textile training in the countries from which these goods are imported is the foundation for this success.

The origination of a design to a great extent is largely theoretical, but if the design is to be used practically, the originator should have a knowledge of the intersecting of threads, the effect different weaves will give in a fabric and a clear conception of the effect that will be produced in the loom; especially if colored threads are introduced into the fabric.

If imported goods have the most pleasing colors and the best designs there will certainly be a demand for these goods. There is always a demand for a good article and that is one reason imported goods are of the best quality. Another reason is that it would cost as much to ship an inferior grade of goods to this country as it does to ship a superior grade, hence we find that there is practically no competition from outside sources in poor and medium classes of goods. It must be inferred, therefore, that it is more profitable to make the best grade of goods.

The work in a textile school is as practical as it is possible to make it without eliminating the theory. At the school with which I am connected the studies and work comprise, not only those which bear directly on textile work, but also those which go to make a well-rounded man, such as forge work, wood work, machine shop, steam and steam boilers and a general education in English and mathematics, thereby emphasizing the development of the man.

I appeal to you as manufacturers and practical mill men to hold out a helping hand and do your share in helping to make textile schools what they ought to be.

National Association of Hosiery Manufacturers

The annual convention of the National Association of Hosiery Manufacturers was held in the assembly room of the Continental Hotel, Philadelphia, May 11, 12 and 13. The program, which was given in our last month's issue, was carried out in full. One of the principal features of the first day's session was the acceptance of the proposition to merge this association with the American Knit Goods Manufacturers Association, the plan proposed being announced by Secretary C. B. Carter in a statement in which he said:

Joseph F. Rambo, President 1907-08.

The interests of both associations are practically the same. Conditions in the hosiery business have been unusually satisfactory, especially in view of the state of business generally, but conditions in the underwear trade have not been so favorable.

Hosiery is almost as staple a kind of goods as foodstuffs. People don't buy underwear so often. It costs more, and when it is worn some, they patch it up. But the purchase of hosiery—that is stockings—is more frequent. The sales are smaller in amount, but much more frequent and steady.

The National Association of Hosiery Manufacturers has accomplished a vast amount of good. It has prevented demoralization in conditions and prices, which would otherwise have resulted in such times as the present.

The American Knit Goods Manufacturers' Association is the younger of the two bodies and not having the same power, was not able to keep conditions as normal as in the hosiery association.

The raw material for both industries advanced abnormally last spring, and in the previous year, but the hosiery manufacturers by means of their association, were able to secure greater advances in prices than the manufacturers did in the underwear trade.

This plan was subsequently voted upon favorably by both associations, and the associations were duly amalgamated under the name of the National Association of Hosiery and Underwear Manufacturers.

The annual address of President Joseph S. Rambo was, in part, as follows:

"During the months of financial depression through which we have passed, that we were enabled to resist the wholesale attempt on the part of the jobbers to cancel orders and disregard their contracts, was very largely due to the existence of our association; and the prompt and vigorous manner in which our members combatted such unfair and unbusiness-like methods, thereby saving our industry from utter demoralization, which would have resulted disastrously to many of us, should be commended.

"The purchasing of yarn upon what has been termed a 'net weight' basis is another thing upon which we feel our association should be congratulated. The so-called eight-hour laws and anti-boycott bills have been springing up continually during the past two years, urged very strongly by certain labor organizations, and presented and favored by certain of our senators and representatives who are anxious to curry the favor of the labor vote. Such legislation would not only be a menace to our industry, but would have a harmful effect on the general community. We are heartily in favor of our children receiving the ground work of an education, but we must realize that there is a point in the education of the major portion of our population beyond which they will not go, and to insist upon a child going to school after he has reached that point does not inure to his benefit. The training to be industrious, to be prompt in obligations and amenable to just rules and regulations is quite as essential in the education of a child as are the "readin' and writin' and 'rithmetic," and in no place is this training better had than in a well-regulated mill."

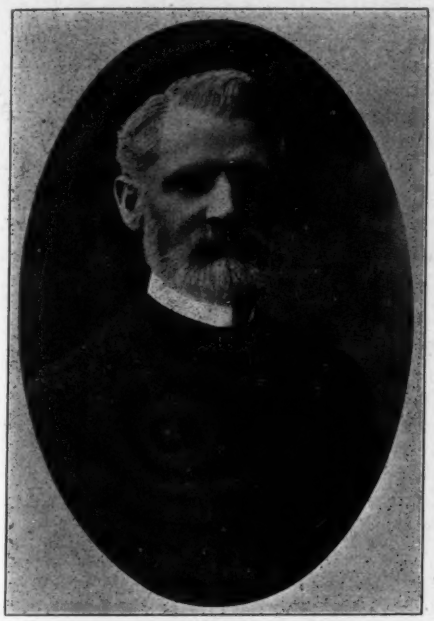
Frederick W. Simons, second vice-president of the association, read a paper on "Trade Associations—a World Power," from which we make the following abstracts:

"I recognize that we are organized for mutual benefit; we are here as business men to promote and protect our own interests as business men. It is probably true, of most of us at any rate, that in the last analysis we are interested in this organization because we hope that in some manner, direct or indirect, it will promote the growth of our own bank accounts. I would like to emphasize the importance of thorough organization and mutual confidence, without which successful co-operation is not possible.

"While as individuals we may frequently misunderstand each other, misjudge each other and mistrust each other, no man can have a reasonable basis for questioning the integrity and honesty of purpose of an association composed of hundreds of representative business men.

"The man who does things usually regards the thinker as an impractical theorist. On the other hand, what shall we say of the man who does things—"the hustler?" This much, at any rate, is true; that his physical activity, his mental agility, his tremendous energy, all militate against

his profundity. The nature of his genius is opposed to reflection, except as to the best method of accomplishing his immediate purposes. His mission is executive; he has a distinct, well-defined idea of what he wishes to accomplish, and finds in the doing of it a sufficient and satisfactory exercise for all his faculties.



FREDERIC W. SIMONS, PRESIDENT 1908-09.

"How many wise thoughts, how many wisely laid plans have come to naught for lack of executive ability, and how much splendid energy has been wasted, or worse than wasted, because it has been unwisely directed."

One of the principal features in the second day's proceedings was an address by William F. Wakeman, treasurer and general secretary of the American Protective Tariff League, in reference to the German tariff agreement, in regard to which Mr. Wakeman said in part:

"In reference to the agreement as a whole, I have not found a single producer, congressman, or senator who was consulted as to its effect before promulgation, or any legal authority which confirms its legality. A high official was recently asked why industrials were not consulted. His answer was in effect that if the industrials had been consulted "there never would have been an end to it," the agreement. The agreement was negotiated in secret, framed in official circles, and after signature forwarded and submitted to the Economic Association of Germany, approved by the Reichstag, and then signed by the Emperior. Indeed the first semi-official knowledge of its contents came to us by cable through German sources.

"I have carefully analyzed and studied the German agreement since its promulgation, and find that it must be treated under three heads:

"First: The administrative features changing the rules and regulations of the treasury and State departments, which in effect nullify important sections of our customs administrative act.

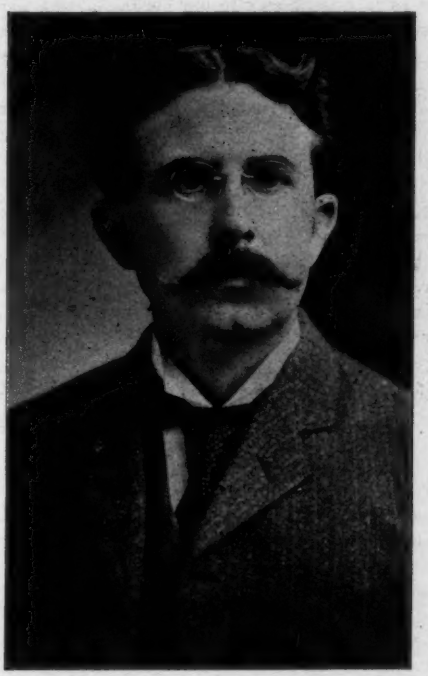
"Second: It recommends important legislative changes in the customs administrative act which, in the judgment of customs experts, would destroy the efficiency of the act, and open the door for vastly increased undervaluations of imported merchandise.

"Third: A comprehensive commercial treaty which is promised by the agreement. We are informed that this commercial treaty has been negotiated, and that it prescribes a reduction of American duties amounting to about 20 per cent. on competitive merchandise.

"Now, regarding the first section, namely, administrative features and modifications of the rules and regulations, we have claimed and now claim that these changes amount to a nullification of sections 19 and 11 of the administrative act, and of sections of the revised statutes affecting the duties of United States consuls.

"As to the effect of the administrative changes now under consideration: As a matter of fact our imports from Germany have increased steadily since the agreement went into effect, namely, July 1, 1907, especially merchandise competitive with American products and merchandise affected by an ad valorem tariff. Naturally this agreement could not change the rates of duty, but it has opened the door to undervaluation by the method of ascertainment of market value, established by paragraph A of the agreement.

"Is it not surprising that during the period since October 1 of last year, you should have an increase of the importation of foreign merchandise in your line amounting to over $1,300,000?



SECRETARY C. B. CARTER.

"There has been no increase of imports from Germany or other countries where specific rates of duty apply, but all of the increase have applied to compound and ad valorem and competitive goods.

"You ought to feel deeply grateful to the ways and means committee of the house of representatives for what it has not done. Let me illustrate: One of the recommendations of the administration was that no penalty should apply until the undervaluation had been established for more than 10 per cent. You and I know that an undervaluation of 9 per cent. will control the American market.

That is simply one of the recommendations made by the administration. If the present administrative features now in effect and legislative changes in harmony with the recommendations of Mr. Roosevelt had been made and carried into effect by legislation many of you would not be in business to-day."

Mr. Wakeman's remarks were subsequently followed by a resolution, passed unanimously by the association, as follows:

"Whereas the United States Government has entered into a tariff trade agreement with the German Empire, which embodies concessions of important amendments to the customs administrative act.

"Resolved, That the National Association of Hosiery & Underwear Manufacturers in annual convention assembled, earnestly protests against the provisions of the German tariff agreement now extended to other countries of the Continent as contrary to law, contrary to the policy of protection, injurious to American labor, unfair to honest importers, demoralizing to the service, and, in effect, a material and indiscriminate reduction in the tariff, which should be made only after hearings granted, and then by the legislative branch of the government; and

"Resolved, That the National Association of Hosiery & Underwear Manufacturers thank the congress of the United States for not adopting the recommendations of the administration as to amendments to our customs laws; and

"Resolved, That copies of these resolutions be forwarded to the president and each member of congress."

OFFICERS FOR 1908-1909.

Fred. W. Simons, Philadelphia, president; Park Moore, Philadelphia, first vice-president; F. H. Weihenmayer, Hagerstown, Md., second vice-president; C. B. Carter, Philadelphia, secretary and treasurer. Executive board—Ernest Blood, Philadelphia; Geo. B. Pfingst, Philadelphia; Julian S. Carr, Jr., Durham, N. C.; Harold Lamb, chairman, Philadelphia; Earl Thistle, Lowell, Mass.; W. L. Fay, F. L. Chipman and Garnett Andrews.

One of the actions of the association was the appointment of a statistician, and to this position, W. F. Carr of the Durham (N. C.) Hosiery Mills was chosen. His duties will be the gathering and compiling of data each month from all association members designed to show the quantity of goods made by each mill, the volume under orders, less cancellations, and the stock on hand. The object is to give members an accurate idea of the mill situation each month, the totals only being given out.

A committee on resolutions made the following recommendations, among others:

1. Net Weight Yarn: We recommend that each member of this association pledge himself to give preference to yarn manufacturers selling on a net weight basis.

2. Help Bureau: We recommend the establishment of a Help Bureau, the association to be paid by the employer an amount equivalent to one week's pay, provided the employe be kept 60 days.

EXIBITIONS OF MACHINERY.

American Drying Machinery Co., Jacob K. Altemus, Beckert Needle & Supply Co., Philadelphia; Berlin Aniline Works, the Credit Office, New York; Harding & Fancourt, Philadelphia; Hemphill Manufacturing Co., Pawtucket, R. I.; J. W. Hepworth & Co., Philadelphia; Industrial Manufacturing Co., Camden, N. J.; E. Jenckes Co., Pawtucket, R. I.; Kaumagraph Co., New York; Lord & Nagle Co., Boston; Manufacturers' Supplies Co., Philadelphia; George D. Mayo Machine Co., Laconia; N. H. Merrow Machine Co., Hartford, Conn.; New York Silk Conditioning Works, New York; Nicetown Dye Works; Paxton & O'Neill, Philadelphia; Robinhold Machine Co., Reading, Pa.; Roesler & Hasslacher Chemical Co., Salvator Transfer Co., New York; Scott & Williams, Philadelphia; Singer Sewing Machine Co., New York; Smith, Drum & Co., Standard Machine Co., James Taylor, Philadelphia; Textile Manufacturers Journal, New York; Tolhurst Machine Works, Troy, N. Y.; E. L. Wing Manufacturing Co., New York.

AMERICAN KNIT GOODS MANUFACTURERS' ASSOCIATION.

This association held its annual meeting in Philadelphia on May 14-15. It was unanimously voted at the opening session to amalgamate with the National Association of Hosiery Manufacturers under the name of the National Association of Hosiery and Underwear Manufacturers. There are sixty-seven members in the association, all of whom become affiliated with the united organization. The new association has now more than three hundred members.

This convention was called to order on the morning of the first day by President J. Clarence Parsons, of Parsons & Baker, Phoenixville. Secretary C. B. Carter in his report took up the question of unjust cancellations and praised the work of the association in almost entirely eliminating this evil from their business. He said, in part, that, "The flood of cancellation of orders from which almost all of our members suffered during the year has at last happily subsided. The decision of our association to refuse to accept any unjust cancellations and the determined resistance made by the members resulted in most instances in the acceptance of the goods ordered and payment for them within the time agreed upon. Besides holding to what were justly our rights in this connection, we have gained more in duly impressing the buyers and jobbers of the country with our strength as an organization and awakened them to the fact that conditions have changed since the day when they could demand and get everything they wanted, irrespective of our rights."

Mr. Carter also brought to the attention of the members a practice which should be wiped out by the trade. On this point he said, in part, that, "It has been asserted by a prominent supply house that 'graft' exists to a more or less extent in the purchase of dyestuffs and other chemicals through employes being bribed to keep out of the dye houses new and better dyestuffs than those at present in use. It has been admitted that the charge made by this concern, through the medium of the trade press and by letters to this office, contains considerable truth, and it behooves all of our members to pay heed to this matter, making investigations as to whether the opportunities for 'graft' in their mills is possible in the purchase of these supplies.

"The warm-heartedness of the average knit goods manufacturer is so generally recognized that he is usually the first victim pounced upon by the unscrupulous. We had during the year many complaints from our members that they had been imposed upon by making contributions to

fake 'newspapers' of various kinds, advertising schemes galore and begging propositions of every nature, that the services of a reporting company were called into action, which company exposed many of these fakirs and warned us against a number of others before they had the opportunity of fleecing many of the association members."

REINFORCED CONCRETE IN COTTON MILL CONSTRUCTION.

A GOOD DESIGNER WITH GOOD JUDGMENT IS NECESSARY. COMPARATIVE COST. AN EXAMPLE OF COST. SAVING IN INSURANCE.

BY J. A. HOLMBOE, C. E. & M. E., *of the Holmboe Co., Engineers, Louisville, Ky.*

(*Continued from May.*)

As practically all portions of a building are subject at times to tensional stresses, it becomes necessary or at least advisable to reinforce all parts of the building.

This reinforcement as already stated, is of steel, generally made with corrugations or deformations of some shape or another. There are a great many different kinds of bars on the market, each one having claimed for it, of course, to be the best; but risking some adverse criticism, I will say that outside of the fact that better steel is used in the one than in the other, there is not much merit in their claim, for a plain bar, generally speaking, will produce enough adhesion to the concrete to break the bar before slipping. The most essential feature is to properly bed the bar in the right place, in the right manner and of sufficient quantity.

Admitting that a reinforced concrete building is the best, the prospective builder wants to know how it compares in cost with other constructions and if it will pay him to put up such a structure.

Sometimes the investor is limited as to first cost and can only afford to pay a certain amount for given results, but generally in cotton mill building the capital behind the enterprise is sufficient, so that if it can be shown to be a profitable investment, nothing short of the best will be wanted.

First cost depends largely on a good designer, who should also be a man of good judgment in securing such competition from contractors as will absolutely secure the best for the money. This is more important in reinforced concrete construction than any other.

Depending on locality, and speaking generally, a reinforced concrete building will not cost over five per cent. more than brick and wood construction, or what is generally termed mill construction. This, of course, has nothing to do with the cost of machinery. And it should cost less than brick and steel construction or any other fire-proof building. Some designers will claim that a concrete building can be built as cheaply as one of mill construction, but such cases would be exceptional, and could only be possible where conditions for concrete were exceptionally favorable, and conditions for brick and timber construction exceptionally unfavorable.

Taken as a straight-out business proposition we will consider a cotton mill costing $100,000 of which $50,000 is for building and $50,000 for machinery, which may, of course, not be the correct proportion, but which by no means favors our argument. Assume that the cost of the building is five per cent. more than the mill construction, or $2,500, and we will see if the owner is justified in this extra expenditure.

Interest on $2,500 at five per cent. is $125, which from the best information at hand would just about equal half the amount of money saved in insurance, assuming that insurance was carried in both cases for the full value of building and contents. It must be borne in mind, however, that the owner could almost afford to carry no insurance at all with a thoroughly well built fire-proof building. Notwithstanding insurance companies give a low rate on mill or slow burning construction, I wish to state, that some of the worst fires I have seen have been those of so-called slow-burning buildings. However, no manufacturer is taking out insurance with the expectation of a fire, but as a mere means to secure funds for rebuilding in case of a fire, for, no matter how well insured, there is no insurance that will compensate for loss of time and interruption to business. Fire to a manufacturer is not like one to a merchant, who can wire his orders for goods and open business in a week's time. Instead, a manufacturer, after much annoyance in settling his loss, has to put up a building for his machinery, and cotton mill machinery can not be obtained from stock, but would require months to get.

It will be seen, therefore, that the saving in insurance will not only pay five per cent. on the extra investment, but will create a sinking fund sufficient to pay for the extra expenditure in about ten years. This is based upon the presumption that the same amount of insurance is carried in both cases. But surely one is justified in carrying less insurance with a fire-proof building than with a so-called slow burning, and additional saving could therefore be accomplished. And, besides, there is no estimating the loss by interruption to business, which is reduced to a minimum by a fire-proof building.

There may be some readers who will question the fire-proof qualities of concrete, and for their benefit I will say, that both the great fires at Baltimore and San Francisco has placed such question beyond doubt, but it should be remembered that most big fires would have been prevented if there were no combustible materials for the fire to feed on, and this, therefore, should be one of the best arguments in favor of a properly constructed reinforced concrete building, for with floors, walls and windows made of non-combustible material, there is nothing in the building, except the cotton itself, to burn, and consequently the chance for a fire to start is reduced to a minimum.

It should not be forgotten that the life of machinery is largely dependent upon a good foundation, so that it will run smoothly and without external vibrations.

Then, again, concrete is the ideal material, for nothing will stand vibration better, as by virtue of the peculiar designs adopted it has great rigidity.

Another item is cleanliness. The floors being of concrete with trowelled surfaces, there is no chance for oil and dirt to accumulate. It may not be amiss to state right here, that where a cement finish is used for floors, as it ought to be, it should be put on at the same time as the floor-slab, as it otherwise will not adhere to it, and very bad results have been observed from not following this method.

In summing up the advantages of reinforced concrete I want to call attention to the following:

Quick construction, independence of other trades, economy, fire-proof qualities ,and besides these the owner's mind can be at as much ease as if he had his money in a fire and burglar proof vault.

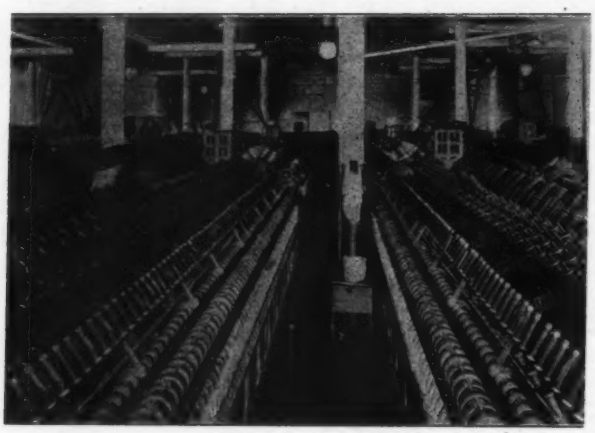
In conclusion I will say that the first thing to do should be to employ a thoroughly competent engineer, for his services will be needed from the beginning with the testing of the soil, until the roof is on.

MILL LIGHTING.

THE UTILIZATION OF SHEET PRISM GLAZING IN MODERN MILLS—HOW IT SAVES AND WHY IT IS OTHERWISE PROFITABLE—BY W. P. B.

The day is past when the manufacturer of textiles need to be told of the advantages of a well-lighted mill. Next to strength of construction and fire resistance, proper daylight illumination is the first consideration of both agent and architect.

Manufacturers have come to realize that no buildings, however well supplied with ordinary windows, is lighted throughout. The light entering through ordinary glass strikes the floor a short distance away and is absorbed. Shafting and machinery near the windows also prevent the diffusion of light.



ARLINGTON MILLS, LAWRENCE, MASS. SPINNING ROOM. LUXFER SHEET PRISMS INSTALLED IN THIS ROOM.

The problem is to bend, extend and divert the rays of light in such a manner as to light every foot of space in the work-rooms. This is accomplished by the use of scientifically constructed sheet prisms, which are set in place of ordinary glass in the window sash, and are made in a variety of angles to "bend" the light rays to any desired point. These sheets are smooth on one side, can be furnished in any necessary angles. and in sizes up to 110 inches wide by 60 inches high.

A saving of from 25 to 50 per cent. in the cost of artificial lighting is ordinarily affected, and it is usually necessary to glaze only the upper sash of the windows to obtain satisfactory results. These sheets can be set by any good mechanic in the same manner as window glass. The cost is but little more than for a good quality of plain glass.

Many of the more important Eastern mills are equipped with Luxfer prism sheets, as, for example, the Arlington Mills, Lawrence, Mass., have increased their equipment of sheet prisms twelve times since 1901; Washington Mills have installed 20,000 square feet since their original order six years ago; and the Wood Worsted Mills installed over 40,000 square feet last year in all the upper sashes of five floors and basement.

Reports on file from mill agents show that installations of scientifically-made prisms produced the following results in every instance: (1) Adequate daylight illumination, with consequent saving in cost of artificial light; (2) increased output as shown by actual figures; (3) decrease in quantity of seconds; (4) marked evidences of satisfaction on the part of operatives.

Scientifically-made prisms are quite different, it should be borne in mind, from some forms of prismatic glass that is made to meet a popular demand, possessing little merit as daylight diffusers, because the angles are improperly made instead of being figured by expert refractionists; and as a consequence frequently lessen instead of increasing the original illumination through plain glass.

ECONOMIC POSSIBILITIES OF GOOD LUBRICATION.

WILLIAM F. PARISH, JR.

If it were possible to entirely remove all friction by means of ideal lubrication, the life of all power machines and all machines driven by power would be greatly increased; almost no repairs would be necessary and practically all the power generated could be utilized for useful work. The great difference in the mechanical efficiency of machines caused by the differences in quality, or in suitability, of the lubricants used is not generally known, and engineers usually overlook the economic possibilities contained in this item of the influence of lubrication upon friction, due, no doubt, to the fact that all lubricating oils are considered "necessary evils" without any particular virtue as compared one with another.

Reduction in frictional losses and consequent saving of power depends upon four conditions:

1. Ability to manufacture various lubricants which will contain a maximum of lubricating nature.

2. The type and condition of the machine or plant to be operated upon.

3. The character and suitability of the lubricant in use and the method of its application.

4. Ability to determine the lubricants which, when placed upon machines of different kinds, will in comparison with those in use produce a lower co-efficient of friction.

The main effects, which show as a result of reducing the friction of a plant and which must appear in the complete summary of a full comparative power test, are as follows:

1. a. Reduction in the total horse-power of the mill.

b. Reduction in the power of transmission and of the power of each subdivisional part of the mill.

2. Reduction in the amount of coal required for developing the power necessary to drive the mill. (Whether it is possible to show this reduction in coal, however, depends upon the ratio of coal to horse-power being maintained during both conditions of lubrication. Many experiments have been made which prove that, in the majority of plants, the amount of coal used is not strictly in accord with the work being done.)

3. Reduction in the amount of feed water used for power purposes. (This item is closely related to the amount of horse-power being developed, assuming, of course, that steam is not blown off and wasted.)

4. Reduction in the temperature of all bearings and spindle bases.

5. a. Increase in the speed of machines and spindles.

b. Increase in the speed of line shaft.

c. Increase in the speed of the engine if the load upon the engine has been excessive. (These increases of speed are due to the fact that reducing the resistance reduces the per cent. of slippage of the driving belts and bands.)

6. a. Increase of production of the plant if the production is related to the speed.

b. Increase in production due to less stoppages—a considerable per cent. of stoppages are caused through defects of lubrication.

7. a. Decrease in repairs.

b. Decrease in the number of bands required for driving spindles.

c. Decrease in the wear on the belts which would be perceptible, during a long period of time, in decrease of renewals.

All the foregoing conditions will show to some extent if a reduction in friction has been made. They all depend upon each other to a very considerable degree.

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COTTON MANUFACTURING

MOCK OR IMITATION GAUZE AND LENO.

BY A. E. TUTTLE.

In one of the issues of COTTON there is an illustration and a brief description of a mock leno cloth that is now upon the European market. As the design shown is an unusual one for this type of goods, it has occurred to the writer that a comparison of it with other mock leno weaves and a consideration of the principles underlying the construction of mock leno goods in general, may be of timely interest.

The term "Mock Leno," is usually given to weaves producing the effects in the cloth without the aid of doups, whether they imitate gauze or lenos. As the gauze effect differs to a considerable degree from leno effects the different types of so called mock leno weaves will here be considered under two headings, mock gauze and mock leno, according to the class of patterns they are supposed to imitate.

GAUZE.

A gauze is made by crossing a certain end or ends over or under another end or ends on succeeding picks. Where the crossing takes place the picks are prevented from being driven closely together by the reed, thereby producing open effects fillingway of the cloth. The crossing of the ends tends to hold them closely together; this, in combination with dents in the reed left without ends, causes an open effect warpway. The open effects fillingway and warpway combine to produce all-over open or perforated effects.

Cloths made entirely with the gauze weave are usually used for netting or screen purposes, the placing of the warp yarns across each other at every pick making a firm, open fabric with a minimum amount of material. The gauze weave is, however, used extensively in connection with other weaves to make fancy patterns.

To construct gauze cloth it is necessary to employ certain additions or attachments to ordinary looms therefore it is more costly than regular cloth to produce.

MOCK GAUZE.

Mock gauze does not require any special mechanism or doups for its construction, being usually woven on ordinary dobby looms. On the other hand the effect obtained is not as clear and defined nor the cloth as strong as gauze.

Mock gauze weaves, although sometimes used for all-over effects, are usually used in connection with the plain and other weaves to make stripe or check patterns.

The objection to all-over imitation gauze cloths is that, on account of the open weave and small amount of material used, they lack firmness.

The principles underlying the construction of these weaves may be noted by examining Fig. 1, which is intended to illustrate a section of cloth woven with weave Fig. 2. The latter is complete on eight by eight and counterchanges every four ends and four picks.

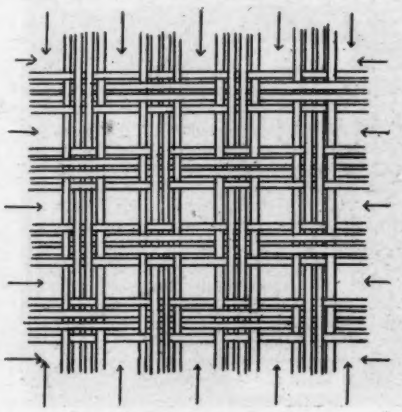


Fig. 1

Fig. 8

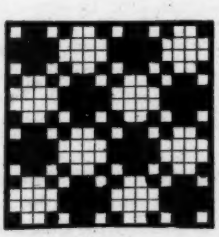


Fig. 2

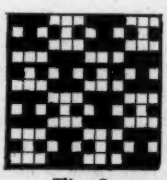


Fig. 3

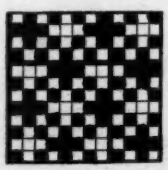


Fig. 4

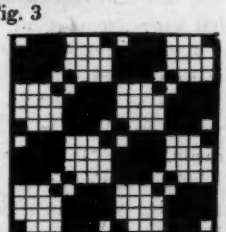
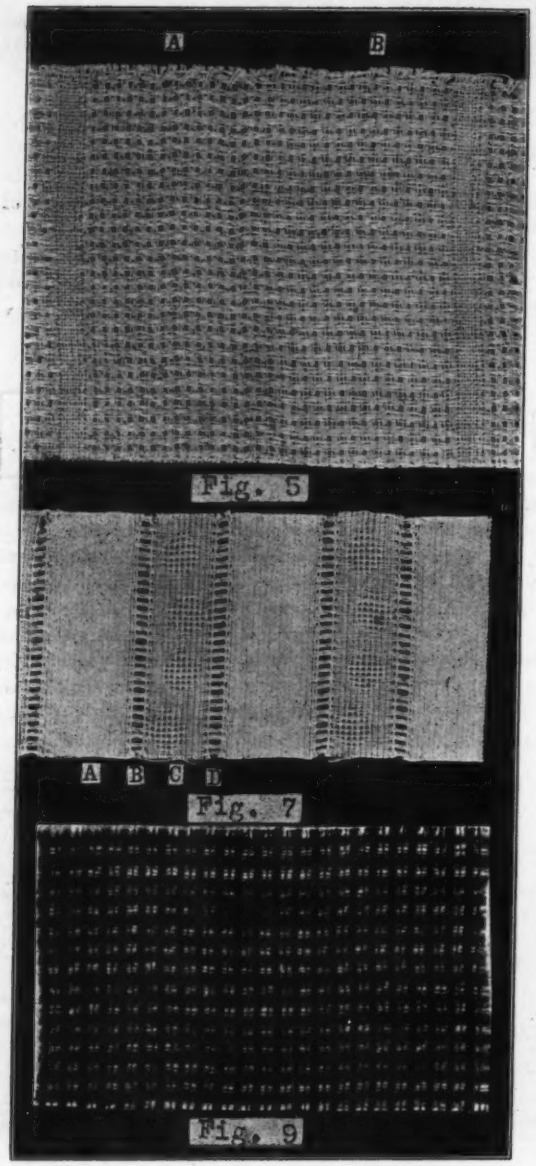


Fig. 6



The interstices or spaces, indicated by the arrows in Fig. 1, are made by the yarns on one side of them cutting or opposing the yarns on the other side, *i. e.* when one yarn is raised the other is depressed in combination with long floats of warp and filling which extend and spread over and under these cutting yarns.

If any section of four by four, starting at the cutting yarns, be examined exclusive of the adjoining yarns, it will be found that there is nothing to prevent the first and last yarns from sliding over or under the two center yarns and coming into contact with each other. This principle is seen in all mock gauze weaves; the open effects are formed by separating, by cutting ends and picks, small weaves in which the yarns come in contact with each other easily.

The more opposing interlacings there are between two adjoining yarns in either warp or filling the greater will be the space between them.

A comparison of weaves, Fig. 3, the weave used in the foreign sample under consideration, and weave, Fig. 4, the six-end mock gauze weave of widest application, and the one used in stripe and check patterns, perhaps, more than all other mock gauze weaves combined, will reveal the fact that there are the same number of interlacings on the ends of each, but that there are six interlacings on each of the cutting picks in Fig. 4, and only two in Fig. 3. Cloth woven with Fig. 4, would show a more open appearance fillingway than if woven with Fig. 3. Weaves, Figs. 3 and 4 are each complete on six ends and six picks.

Suiting cloth made with weave Fig. 3 would be preferable to cloth of the same material woven with Fig. 4, on account of the comparative closeness of the yarns fillingway and the more prominent effect warpway as compared to fillingway.

A recognized factor in almost all textiles is that the effect warpway should be at least as prominent as the effect fillingway in order to prevent barrenness across the cloth. To accentuate the effect warpway in mock and gauze the yarns are reeded so that the cutting ends will be separated by the reed wires. A still more open effect is caused by leaving an empty dent between the cutting ends; this is usually done with stripe patterns. In check patterns the ends are reeded equally as it is desired to have them spread evenly when not weaving mock gauze.

Fig. 5, illustrates a sample made for the purpose of comparing the effects made with weaves Figs. 2 and 6. Section A was woven with weave Fig. 2, and section B with weave Fig. 6. The fact that the cutting ends interlace oftener in the former makes the interstices more prominent. The ends were reeded two in a dent. A more open

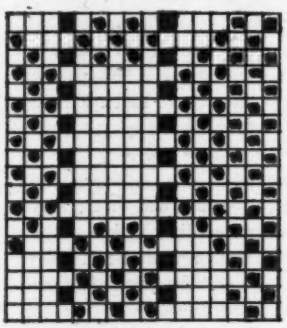


Fig. 13

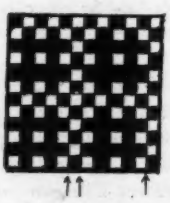


Fig. 10

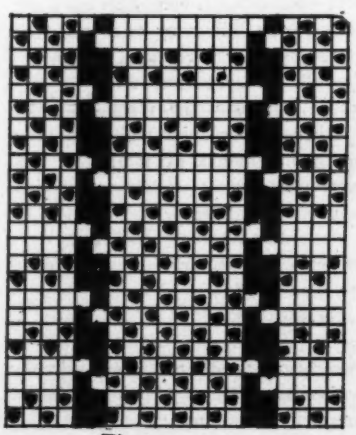


Fig. 15

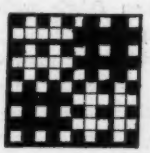


Fig. 11

effect would have been made if the end had been reeded four in a dent.

Fig. 2, is known as the canvas weave. It does not make as open effects as some other weaves, but is valuable in the construction of cloth to be used for embroidery and needlework purposes. For such cloth has an all-over mock gauze effect, the weave being used alone. It is of coarse texture, made from ply yarns in both warp and filling.

Fig. 7, illustrates a fabric in which gauze and imitation gauze weaves have been combined with the plain weave to make a stripe effect. The pattern consist of four sections, as follows:

SECTION	ENDS	DENTS	WEAVE
A	90 as 45	15	Plain
B	2 of 2-ply	1	Gauze
	2 empty		
	2 of 2-ply	1	Gauze
C	30	10	Plain and mock gauze
D	Same as section B.		

33 dents per pattern.

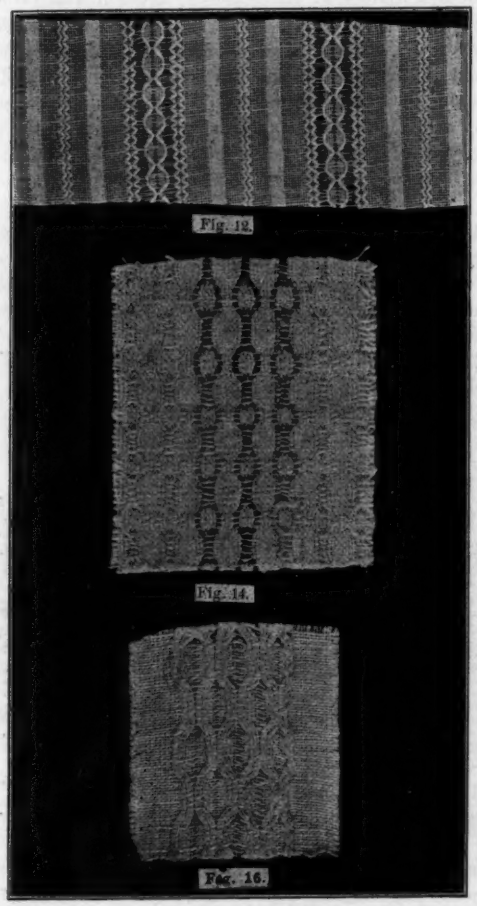


FIG. 12.

FIG. 14.

FIG. 16.

The gauze sections are complete on eight picks, four picks in the open shed and four picks in the cross shed alternately.

Fig. 8 will give a clearer view of one of these sections.

Two picks only characterize the gauze weave proper, the ends crossing between the first and second picks. In Fig. 8, picks two and three show one repeat of the gauze weave.

Four repeats of the mock gauze weave in Fig. 7 are shown in Fig. 4.

Fig. 9 illustrates a cloth woven with the five and one mock gauze weave Fig. 10. The latter is regarded by many as being the best weave to use when a prominent open effect is desired. The ends are ordinarily reeded five in one dent and one end in one dent alternately, being grouped as indicated by the arrows; but when used in combination with other weaves for check purposes it is advisably to reed them two or three in a dent.

Weave Fig. 10 is complete on six ends and six picks.

Fig. 11 is a ten end mock gauze weave—the sections counterchanging every five ends and five picks. With this weave the ends would be reeded in groups of five.

With the exception of Fig. 10, the mock gauze weaves shown calls for an equal number of ends raised on each pick and make effects that are similar on both sides of the cloth.

LENO.

Leno is made by crossing warp yarns as in gauze, but differ from the latter in that at least one pick of filling is inserted between the crossings. A leno can not be made on less than four picks.

Leno, weaves, while making open effects, are more valuable for producing zigzag effects. They are usually developed with douping yarns of lower counts or of different colors than the end or group of ends which they cross.

Fig. 12 illustrates a leno stripe pattern in which the open effect is made by leaving a number of dents without ends when weaving, the coarse yarns weaving leno.

MOCK LENO.

Mock leno weaves form zigzag effects in the cloth, somewhat on the lines of the large leno effect in Fig. 12, and it is possible to make them so that it would take an experienced man to note any difference between them without a minute analysis.

Fig. 13 shows a weave for a cloth of this character, the effect of the same being shown in Fig. 14.

The colored ends in Fig. 14, represented by ends four and ten in Fig. 13, are placed on a separate beam and allowed to come forward considerably faster than the ground ends; a curved end requiring a greater length of yarn than a straight one to weave a definite length of cloth.

The sections of plain ends on picks 7 to 15 spread out and force the colored ends into contact with each other immediately over the 7th end. On the remaining picks the colored ends are separated, the plain weave on ends five to nine forcing them to left and right over the 1st and 13th ends.

Fig. 15 is a mock leno weave of a slightly different type. In this instance the warp does not float for more than three picks at the back, but it will be seen that ends 5, 6, 15 and 16 (coarse ends) are raised on such ground picks as weave plain, the object of this being to allow them to slide over easily.

The construction of the lower half of the weave is such that the coarse ends in the cloth tend to slide outward over the adjoining ends, whereas with the upper half they tend to slide inward and come into contact with each other.

The center of Fig. 16 shows the effect of three repeats of this weave in the cloth, the zigzag ends working three as one.

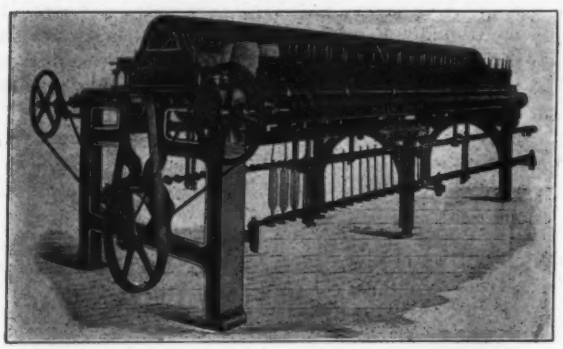
Fabrics that have been here considered as lenos are

sometimes termed net leños' by the trade. Effects known as hemstitch are made by placing a certain number of ends in the cross shed and an equal number of ends in the open shed alternately, as in Fig. 8.

PREPARATORY MACHINERY.

BY F. W. HORROCKS.

In Lancashire, England, spinners are equipped to cater for the requirements of any market, from the best to the poorest. The highest counts of yarn it is possible to spin are used, and also all kinds of waste material is used, such as sweepings, fly from the card room, old ropes, etc., by breaking them up and converting them into cotton yarn of counts below No. 1's, in which the counts are indicated by the number of yards in one ounce.



COP WINDING MACHINE WITH YARN CLEANING MOTION.

These various qualities of yarns require different methods of treatment, and in some sheds where a wide range of goods is woven, the preparation department as well as the weaving shed is arranged with a variety of machinery to manipulate the different qualities and classes of yarn. For the ordinary run of yarn, known as medium counts, the ordinary mangle wheel winding-frame is generally used, the yarn being wound off twist caps on to warpers' bobbins. When ring frame bobbins are used, they are placed on the same skewers as when twist caps are used, the yarn being wound off the nose of the bobbin. Some manufacturers prefer the heart cam motion for giving the barrel-like shape to the full bobbin, but there does not appear to be any real reason for preference either way.

In order to make a perfectly formed bobbin, it is necessary that the revolving spindle upon which the bobbin rests should be set at the proper height, so the footstep in which the spindle runs has an adjustable screw underneath. These winding frames are of various widths, and may hold up to 300 spindles.

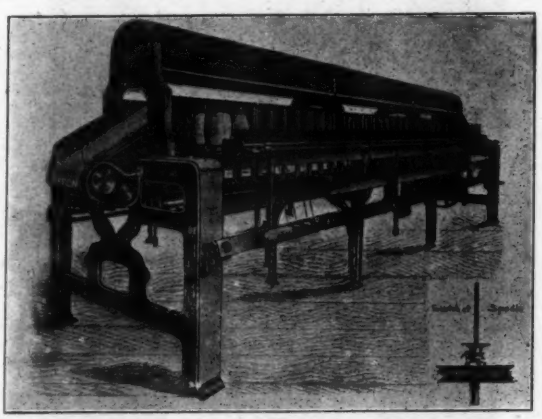
Winding is a process in which a considerable amount of fly dust is made by loose fibers becoming detached from the threads, this being particularly the case in the winding of the coarser yarns. So long as this loose fly is collected in the winding room no harm results to the yarn, but sometimes it settles upon the yarn and adheres to it through the subsequent processes of warping and sizing. These form lumps upon the yarn and are oftentimes a fruitful cause of breakage of ends and damage to cloth. In some sheds means are used to avoid this inconvenience by cleaning the yarn during the process of winding and at the same time gathering together in one place the loose fly or fluff.

In yarn cleaning frame, shown herewith, the yarn passes from the cop or bobbin to the warper bobbin in the ordinary way, but instead of passing across a flannel covered board, the ends come in contact with a plush covered roller which revolves in the opposite direction to that of the yarn and effectually takes all the loose fibers from the yarn, and at the same time a piece of wire card behind the roller takes the loose fluff off the roller, the card being frequently cleaned by the winder.

Another recent improvement, or rather addition to the winding frame, is the traveling apron, as seen in the accompanying illustration, which is placed behind the warper bobbins. This apron is an endless piece of cloth in constant motion and carries the empty spools or ring bobbins the length of the frame and drops them into the boxes or skips to be taken back to the spinning department or mill.

In manufactories of colored or bleached goods, the yarn oftentimes arrives at the winding room in the form of dyed or bleached hanks, for which provision is made in the way of swifts or ryees, or pairs of bird-cage bobbins around which the hanks are placed. These dyed or bleached or mercerized hanks do not pass across either brush or flannel board, but tension is applied to the yarn by means of a small weight hung upon the boss of the ryee, and by the yarn being passed under and over two or more tension rods.

Drum-winding is a common method in sheds where coarse bleached or dyed yarns are used. In these cases the warper bobbins are placed horizontally upon revolving drums, the bobbins being pressed down upon the drums by



RING WINDING MACHINE WITH SELF-CONTAINED SPINDLE.

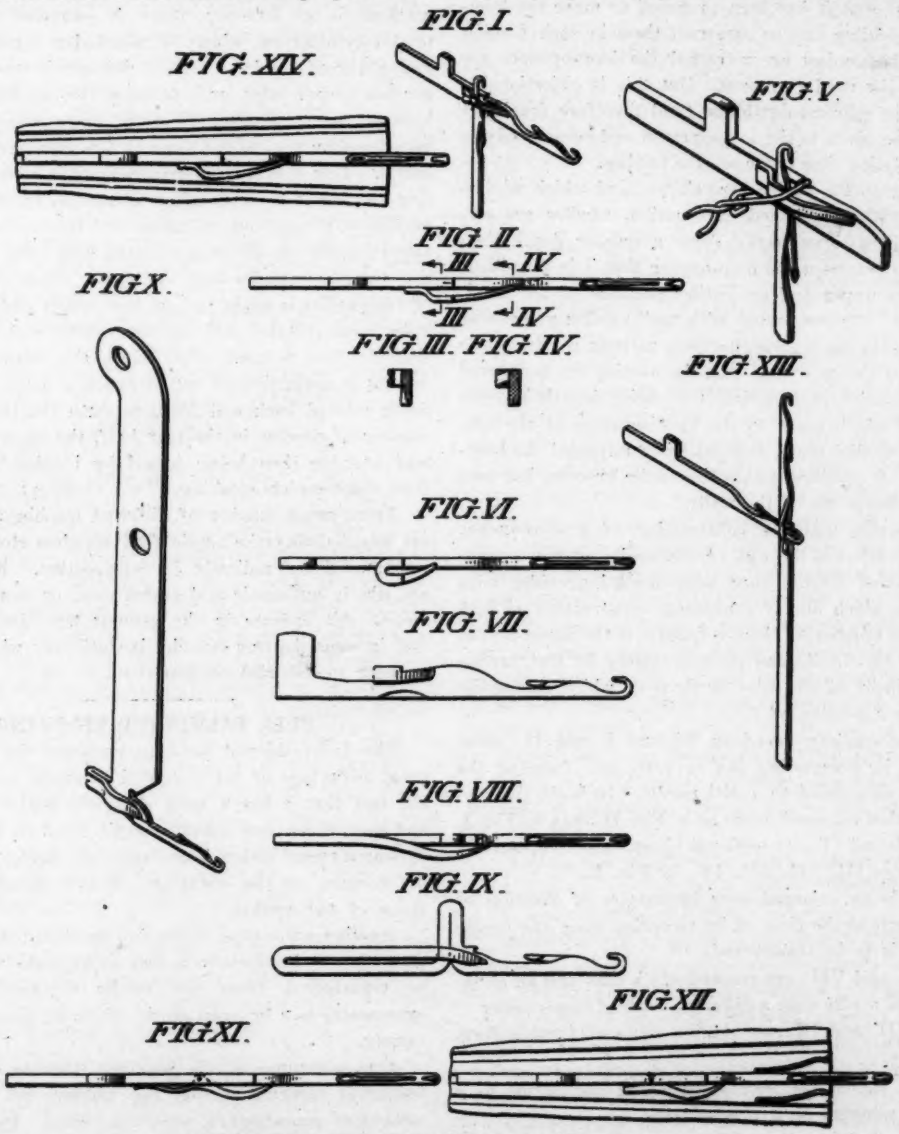
means of a weight. In some cases, the bobbin is lifted up out of contact with the drum automatically when full, in other cases the winder has to do it. The yarn is made to traverse the width of the bobbin by means of a heart cam, the full bobbins being straight, not barrel-shaped. There are drum-winding machines in which the traverse of the yarn is made by a slot in the drum through which the yarn passes. This arrangement, though very ingenious, has not been very extensively adopted, perhaps because it is somewhat rough on the yarn. In drum-winding machines provision is sometimes made for two bobbins to be wound upon one drum. Sometimes the yarn is wound upon paper tubes instead of bobbins.

KNITTING

TRANSFERRING DEVICE.

At certain points in certain knitting operations it becomes necessary that loops held upon the needles be transferred to other needles. Devices for accomplishing this are called "transferring devices," and a number of such devices are well-known. It is also old in the art to employ a loop-opener attached to or formed upon the needle which holds the loop to be transferred so arranged that when the needle carrying the loop is thrust forward to the proper extent, the loop is expanded laterally and forwardly and in such expanded position lies in such position in relation to the needle, that if a transfer point, or preferably another needle, to which the loop is to be directly transferred is projected alongside the first mentioned needle in proper relation to it, it will receive the loop and hold it while the first mentioned needle is withdrawn, the loop-opener being so constructed as to permit the proper relative motion of the two needles. Such loop-openers may be used in machines adapted to knit both rib and plain tubular fabric as a continuous operation.

In these machines the top being of ribbed knitting requires the use of a dial plate carrying horizontal needles, while the body of the stocking, being plain knitting, is knit wholly on the vertical needles. It is therefore necessary at the point of transition from one variety of knitting to the other to transfer all of the loops held upon the dial needles to the corresponding vertical cylinder needles. To accomplish this all of the dial needles may be provided with loop-openers. At the proper point in the operation all the dial



TRANSFERRING DEVICE FOR KNITTING MACHINE.

needles are projected so as to bring these loop-openers into play to expand their loops. Thereupon, the cylinder needles which are to receive these loops are advanced until they enter the loops. The dial needles are then withdrawn leaving the loops upon the cylinder needles alone.

A difficulty has been experienced in connection with the employment of these loop-openers by reason of the space which they occupy alongside of the needle to which they are attached. In order to make room for them when the needles are retracted in prior machines employing loop-openers, the walls of the grooves which receive the needles, have been cut away. The difficulty with this expedient is that when the needles are projected they lose the lateral support from the walls of the needle grooves which is desirable in all forms of knitting operations, and which is particularly desirable in connection with transferring operations, where the utmost precision in the alinement of the needles is required.

In order to prevent the cutting away of the walls of the needle grooves, it has been proposed to make the loop-openers so yielding and to construct them in such fashion that when the needles are retracted the loop-openers are sprung into the needle grooves. But this is objectionable because of the extreme flexibility (and therefore fragility) which must be given to the loop-openers and because of the additional friction thus put upon the needles.

According to the device here shown, and which will be understood without detailed explanation, needles are employed which in cross section have a greater depth than usual, and so construct the loop-opener that it is coincident with only the upper and projecting portions of the shank of the needle. By employing with such needles grooves of the usual depth, the loop-opener will entirely overhang the needle wall of the groove so that the needles are supported and held in alignment during the entire length grooves the walls of which reach to the knitting edge of the needle cylinder or dial plate, and yet when retracted the loop-openers are not received within the needle grooves, but pass over or overhang one of the walls.

In connection with the construction of a loop-opener which thus overhangs the wall of the needle groove, a number of forms of needles have been devised provided with loop-openers which are of convenient construction as here shown. In a number of them a feature is the integral construction of the needle and its loop-opener by the turning back upon itself of the wire or strip of which the needle is formed or a portion of it.

In the accompany drawings, Figures I. and II., show respectively in perspective and in plan, one form of the loop-opener as applied to a dial needle. In both, the needle is somewhat enlarged, more so in Fig. II. than in Fig. I.

Figs. III. and IV. are sectional views, taken respectively along the lines III., III., IV., IV., in Fig. II.

Fig. V. is an enlarged view illustrative of position of expanded loop at the time of its reception upon the needle to which it is to be transferred.

Figs. VI. and VII., are respectively a plan and an elevation of a dial needle with a different form of loop-opener.

Figs. VIII. and IX., are similar views of another form of the device.

Fig. X., shows one way of applying the device to a dial needle mounted on a pivoted jack.

Fig. XI., shows in plan still another form of the device.

Fig. XII., shows a portion of a dial plate carrying a needle fitted with the device, in an alternative form in which part of the operating devices are attached to the dial plate.

Fig. XIII., shows the device as applied to a cylinder needle.

Fig. XIV., shows a portion of a dial plate carrying a dial needle of the construction illustrated in Figs. I. and II.

SEAMLESS SINGLE FEED STOCKING.

This stocking has a leg and foot both of the same diameter and each of uniform diameter and the shaping of the leg is effected by stretching the same on a board. This stocking is made of a single thread which extends spirally round and round to form a cylindrical leg, thence back and forth to form the heel, thence spirally round and round to form a cylindrical foot of exactly the same diameter or circumference as the leg, and thence back and forth to form the toe.

The method of knitting such a stocking on a circular machine is as follows: There is provided a stationary needle cylinder on which is mounted a circle of needles and a thread guide. A cam cylinder is provided which continuously rotates and actuates the needles, one after another, to cause them to form loops and attach those loops, one by one, to the loops in the preceding turn of the spiral. This operation continues until a cylinder constituting the leg is formed, after which the front half of the needles is thrown out of action and the heel is formed on varying numbers of needles in the rear half by reciprocating the cam cylinder back and forth. Then the front half of the needles is again thrown into action and the cam cylinder again rotated and another shorter cylinder constituting the foot formed, after which the front half of the needles is again thrown out of action and the cam cylinder again rotated back and forth to form the toe on varying number of needles in the rear half, the open edges of the heel and toe then being joined by looping or sewing to form the complete stocking.

There are a number of different machines on the market adapted to make single feed seamless stockings, which machines differ radically in construction. Further, some are wholly automatic and others more or less hardly automatic. All operate in the general way described except that in some the cam cylinder is stationary while the needle cylinder rotates and reciprocates.

FULL FASHIONED STOCKING.

The full-fashioned stocking possesses the incontestably great advantage of being knitted to shape, and in spite of the fact that it has a seam along the bottom of the foot and back of leg, and notwithstanding that its slower method of manufacture makes it probably the most expensive type of stocking to the consumer, it still commands its old share of the market.

Another advantage of the full-fashioned stocking is that its mode of manufacture is such as to enable the stitches to be transferred from one needle to another to form ornamental lace or open work effects of great beauty and variety.

One advantage of the seamless stocking over the full-fashioned stocking is that the former, by reason of its method of manufacture, avoids the seam. Its main advantage, however, is that it can be made with greater rapidity

than the full-fashioned stocking. Its great defect is that it is not knitted to shape, being stretched to shape on a board and consequently retaining its fashioned form for but a limited length of time. These remarks apply to both the single feed and plural feed seamless stockings, the latter possessing the advantage of being knit more rapidly (two, three or four rows of stitches being knitted at each revolution of the cam cylinder) while having the disadvantage of requiring mechanism for controlling the several thread guides.

FULL FASHIONED STOCKING.

The essential characteristic of this stocking is that it is shaped, by knitting, to conform to the shape of the human leg and foot, the foot and leg being made of different diameters and the leg being gradually varied in diameter at the calf by gradually varying the number of needles in action for the purpose of varying the number of stitches. The heel and toe are also formed by throwing appropriate needles into and out of action. The stocking is knit on a flat or straight machine and is in the form of a flat web, the two edges of which are, after knitting, brought together and united, either by sewing or looping, thus forming a seam extending along the bottom of the foot and up the back of the leg. These stockings are usually made of a single thread.

THE TRANSFER STOCKING.

This stocking is made partly on one machine and partly on another. Specifically, the leg is made on a circular machine out of a single thread or a plurality of threads, and then the heel, foot and toe are made usually of a single thread, on another machine, and the two parts of the stocking united by looping or sewing.

The transfer stocking has the obvious advantage of permitting the entire leg to be knit on a machine adapted to make plain circular work only, while the more complicated and expensive machines adapted to form a heel and toe are used only to foot the stocking. Further, the back of the leg can be made with open or lace-work effects without meeting the problem of discontinuing such effects during the formation of the foot; as the foot, being made on a different machine, can be made wholly plain, or plain with lace work on top, as desired.

The fact that mercerized cotton seems to imitate silk by no means proves it inferior for many purposes. It has a legitimate field of its own.

Colored yarns passing through a hot, or more often a boiling, solution of size are liable to lose some of their color, certainly to suffer some alteration in shade, and, generally speaking, to become dulled.

DYEING, BLEACHING AND FINISHING

COTTON WARP SIZING AND FINISHING.

A PRESERVATIVE OR ANTISEPTIC. MILDEW. BACTERIA. DEODORANTS. FORMULAS FOR SIZING. AND FINISHING.

BY HERBERT A. FOLSOM.

(*Continued from May.*)

A final addition to the warp-size mix is the preservative. A preservative or antiseptic is often looked askance upon by the spinner and warper. "My size-mixes are used fresh, hence no need to add sour preservatives," says one superintendent. "Never have complaints of mildew and doubt the complete efficacy of antiseptics in case of mildew. The preservatives, moreover, mostly give a carbolic or undesirable smell to the yarn." "That is all very well," says the finisher of the goods, "but why does your cloth come to me smelling sour? Why is it full of stains? Why does it turn yellowish and smell rancid on storing? There is something in your sizing, too, that requires an uncommonly hard boiling off, and an extra bleaching. This makes us liable for tender goods." Surely, as it adds but little to the cost, it would seem that an ounce of preventative (preservative) should be worth a lot of dollars in the finishing and sale of the cloth. The question becomes one of especial application. If the cloth is for immediate sale and use, all is well. But suppose the unfinished warps or goods must be stored, as in a time of business depression. What then?

Mildew is a fungous growth of low order. There are many varieties of it. It attacks vegetable matter by preference, but when properly cultivated in the media of size preparations or finish, it spreads over the surface of cloth, staining, tendering and destroying it. It harmfully affects not only cotton, but wool and even leather. It produces stains of various colors,—the small specks or pits of a brownish tint being particularly destructive and these are sometimes mistaken for iron rust. Akin to yeasts and moulds, mildew thrives best in moist, dark places,—some kinds preferring a slightly acid contact, others alkaline.

Besides checking the growth of mildew, another duty of the preservation is to thwart the action of bacteria. Bacteria belong to the lowest order of life, and are of infinite variety. They act upon and destroy starches, glues, gluten, albuminoids, vegetable and animal oils, etc. The decomposition is accompanied by liquification, foul odors and rancidity (in oils.) Bacterial action in cloth may go on imperceptibly when mildew itself is not present. Thus when sized goods "age," "smell rancid," or 'turn brown," the bacteria are at work.

So we see from the above that the preservative has a twofold duty: First, to insure the size mix ready for use. Second, to protect the fabric after the size has been applied to it.

Among the preservatives are: Benzoic acid, salicylic acid, carbolic acid, creosote, thymol, chloroform, formaldyhyde, zinc chloride, and zinc oxide.

Other materials such as common salt, glauber's and epsom salts, alum, borax, etc., are mentioned in this connection, but their germicidal effect is feeble unless they are used in quantity. Their rather doubtful utility is to add an element of hardness to the size, to prevent stickiness ("tac") in the warp threads, to emulsify the fatty matters, and to yield a "crisp" finish.

Zinc chloride is an old reliable preservative and zinc oxide is a good substitute for it, especially where it can be

used with chalk, clay, talc, gypsum or barytes as a filler and weighter. It is insoluble in water, and therefore free from the objection which the very soluble zinc chloride has of making zinc "soaps," or staining the cloth.

Of the organic preservatives, not more than two oz. to 100 lbs. of dry starch or gum are required, and of these formaldyhide is one of the cheapest and best. It must be used in moderation for upon evaporating it emits a vapor, irritating to eyes and nose. It can not be used in combination with animal glue size or albumen, for these it curdles and hardens.

Myrbane, lemon oil, essential oils, etc., act the role of deodorants,—not preservatives.

Having considered the materials used in making a size, we face the more difficult problem of applying them in the most satisfactory manner and of judging which are best adapted to the work intended. Their variety is not great, and, if we put them to the test of ultimate cheapness and efficiency, their selection is not hard. Of course, the problem can be made difficult, that is, if one cares to listen to all that the office help, the starch dealer, the "demonstrator," or the selling house have to say about it. What course should we take, when we find one textile mill wedded to potato starch while another mill of the same capacity, amount and quality of production is as determinedly committed to corn starch for its sizing? The preference these two starches, does not lie with the management of the mill, nor indeed with the previous management.

A generation of precedent in size mixing has become a fixed custom,—a custom that seems to be understood by the warpers, the looms, the mangles,—the very machinery itself! However, if we perplex ourselves with this mysterious matter of "custom," we can form no correct opinion. Rather, let us turn to the laboratory, the slasher and the loom. There we may gauge fairly well the requisite size for a given class of work, and the mill that runs the smoothest and the most economically, is the one that makes its comparative size trials accurately, that records for future reference the poor working as well as the good working-size methods. Such a mill is not prejudiced against an innovation, is not tied to "custom," yet is willing to try and is competent to judge.

FORMULAS FOR SIZING AND FINISHING.

Below we give a list of size formulas; the list includes some that are at present in use in some of our largest mills, also several finishing recipes. A size recipe is not infallible. It can best but serve as a guide to the user, whose knowledge of all the requirements should enable him to adapt it to conform to local conditions.

PURE WARP SIZE—LIGHT.

100 gals. of water	3 lbs. tallow
75 lbs. potato starch	2 oz. caustic soda
3 lbs. white dextrin	2 oz. formaldyhide

This makes a 5 per cent. size by weight on the yarn. Potato dextrin could be substituted for white dextrin. The tallow prevents frothing.

PURE WARP SIZE—HEAVY.

100 gals. water	10 lbs. potato dextrin
50 lbs. corn starch	2 lbs. size softener
50 lbs. thin boiling corn starch (60°)	1 lb. tallow
	2 oz. formaldyhide

This makes a strong size, about 10 per cent., and stands well.

PURE WARP SIZE—GINGHAMS.

100 gals. water	3 lbs. corn patent starch gum (diastase gum)
10 lbs. potato starch	1 lb. wax or softener
20 lbs. corn starch	2 oz. preservative

PURE SIZE—DENIMS, ETC.

100 gals water	6 lbs. gloy
60 lbs. potato starch	1 lb. tallow or softener

The "Gloy" is made by boiling to a clear solution 20 lbs. tapioca-flour in 10 gals. of zinc chloride, then thinning with water to 50 gals.

WARP SIZE—DUCK CLOTH.

100 gals. water	3 lbs. fish-foots
40 lbs. sago	1 oz. salycylic acid

FILLING (CLOTH) SIZE—TICKINGS, DENIM AND DUCK.

100 gals. water	10 lbs. barytes
20 lbs. tapioca flour	½ lb. zinc oxide
30 lbs. corn starch	2 oz. japan wax
10 lbs. gypsum	

FINISHING SIZE—LAWNS, ETC.

100 gals. water	½ lb. white softener
10 lbs. thin boiling corn starch	Bluing.
5 lbs. tapioca flour (white)	

In the above, white dextrin can be substituted for thin boiling starch,—also potato starch for tapioca flour.

FINISHING SIZE—HARSH.

100 gals. water	1 lb. gum arabic
10 lbs. rice starch	½ lb. softener
10 lbs. corn starch	Bluing.

FINISHING SIZE—SHEETING.

100 gals. water	20 lbs. white china clay
15 lbs. potato starch	10 lbs. tapioca dextrin
45 lbs. corn starch	5 lbs. cocoanut oil
80 lbs. sulphate of lime	80 lbs. white size softener
20 lbs. talc	

Same as above, except the potato starch and tapioca dextrin are left out and 20 lbs. thin boiling cornstarch (60°) are added.

The "white softener" in above mixtures is a stearic acid softener, containing preservative.

PATENT MEDICINES IN THE TEXTILE INDUSTRY.

PRODUCTS SHOULD BE BOUGHT UNDER TRADE NAMES AT MARKET-VALUE, OR EXAMINED BY A TEXTILE CHEMIST, OR THE BEST OF ALL TO BUY ON SPECIFICATION—BY F. D.

One of the evils which threatens to become greater and greater as years roll on is the patent medicine in the textile industry. There was a time when sulphated oil was sold as sulphated oil and soda ash was sold as soda ash but at the present day these materials are often given fictitious names and at the same time the price is five or ten times as high as the value of the article. As an example of this a sample of bisulphite of soda which was recently brought to my attention was sold as "Muller's Antichlor" at $7 per 100 pounds. This chemical may be bought in the open market for 85 cents per 100 pounds.

Again, lard oil costs about $1 per gallon and mineral oil is worth about 20 cents per gallon. The shrewd broker by a little calculation of his own, makes a half-and-half mixture of these oils and then to convince the buyer that the oil is good he charges one dollar per gallon for it. Soaps consisting mostly of soda ash are sold as soaps especially suited for hard water in order to justify the price of 5 or 6 cents per pound. Thanks to the activity of our water-purification engineers we are now no longer dependent on the dreaded "boiler compound." Where formerly the boiler was used as a cook-pot for chemical reactions it now serves but its one original purpose, the water being purified before entering the boiler.

It is sincerely to be hoped that industrial "patent medi-

cines" may soon be made impossible in our industry and so pave the way for gradual healthy development of a craft to which America owes much of its prosperity. The only remedy seems to lie in burying our chemicals from the manufacturer or from those merchants who are willing to sell their products under their trade names at *market value*. The alternative is to have the mill chemicals periodically examined by a competent textile chemist, but the best of all correctives is to "buy on specification."

The ever increasing competiton in the textile trades has made it necessary in many cases to offer chemicals and drugs at very low figures. As many of us can testify, this is not always consistent with good quality so that many of our large plants have instituted the plan of buying their materials only, "on specification." This means that they must comply with certain fixed standards, or that the strength of the particular chemical be specified at the time it is offered for sale.

To give examples that are familiar to many of us—illuminating oils must show a certain "flash point," lubricating oils must stand the viscosity and "cold" tests, while wool oils must contain no mineral oils or if present their amount must be specified. The specifications for government contracts in which every detail is carefully defined furnish a good example of this method of purchase. Many dyers have of late years realized the necessity of this with the result that they are now "getting their money's worth."

It is true, the large German dyestuff factories have for years endeavored to maintain a standard of quality for their products, so that a dyestuff bought in January is exactly as if bought a year previous. We have here one isolated case in the drug trade. When buying on specification was first demanded by the consumers, the dealers objected strenuously, and now such of them as were bona fide merchants are most desirous of having the system extended.

EFFECTS OF BLEACHING AND MERCERISING ON COTTON.

STRUCTURE OF THE COTTON FIBER. ACTION OF CUPRATE OF AMMONIA AND OF SULPHURIC ACID.

Cotton is a singled cell hair. When the hair is alive the cell wall contains protoplasm, and is surrounded by an external sheath or cuticle. The cavity of the dead cell contains air and the remains of the proptoplasm, and is called the lumen. The protoplasm dries up, and usually forms a thin lining to the cell wall, but sometimes assumes the shape of horny detached grains. Hohnel describes the contents of the lumen as consisting of an extremely thin skin of albuminous bodies, and says that both they and the cuticle remain when the cellulose has been dissloved in cuprate of ammonia, or in concentrated sulphuric acid. At the same time, the internal skin becomes traversed with cross-markings, as the result of concentration. The writer has never been able to see these stripes, although they are figured in Hohnel's book.

The cell wall of the cotton fiber consists of several layers, which become clearly visible after treatment with solutions of cuprate of ammonia or sulphuric acid, which, while strong enough to swell up the cellulose, are too weak to dissolve it.

The cuticle can not be fully identified with ordinary vegetable epidermis. It is like the cotton fiber itself, a unicellular structure. It is smooth and strong, and possesses a certain degree of elasticity. In raw cotton it shows a granular character. It is very resistant to cuprate of ammonia, and also to any but the most highly concentrated oil of vitriol. The monohydrate of 66 deg. B. dissolves it without leaving any sensible residue.

The detection of the cuticle is only easy in the case of

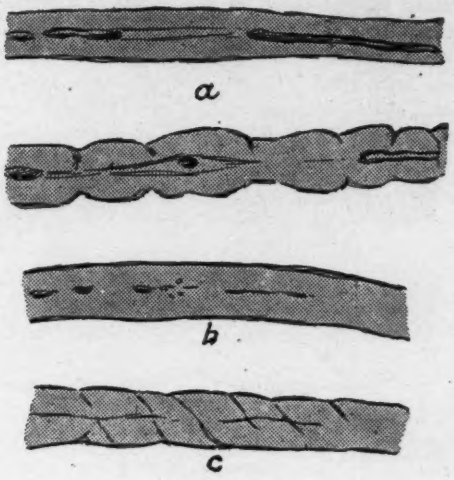


FIG. 1

Mercerised fibres *a* from wadding under the microscope. *b* and mercerised fibres from a fabric under microscope.

raw cotton. Mechanical treatment and still more chemical treatment makes it so thin that it may escape observation. It must be remembered that the cuticle is not entirely composed of cellulose, but contains albumens, vegetable fats and waxes, resins, and also cutin, a horny substance, unaffected by sulphuric acid. It is beyond a doubt that many, if not all of these accessory bodies, dissolve in alkalis and therefore in the course of bleaching or mercerising, when the physical properties of the cuticle are altered by these operations, it becomes far less conspicuous. The following

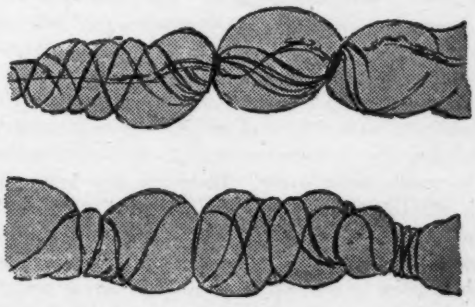


FIG. 2.

Raw fibres swollen in cuprate of ammonia (cuticular shreds, cuticular rings, band-shaped appearances, spiral windings of the cuticle, delicate foliated structure of the fibre, &c.).

researches were made by the writer to investigate the effect of bleaching or mercerizing on the cotton-cuticle.

Although mercerisation is possible at the ordinary temperature, temperatures in the neighborhood of zero C. are more favorable. Nevertheless, the microscopic work of this investigation had to be done at the usual room temperatures. Clean wadding was selected for the experiments, and the effect of the mercerising lye was observed under the microscope. It begins actively the moment the lye

touches the cotton, and the fibers uncurl and swell up. The swelling is uniform for the most part. The fibers become more homogeneous in structure, and of a dull bluish-green color. The air inside the fiber is displaced by the partial disappearance of the lumen, and so accumulates in isolated portions of the cotton. Some of the fibers swell more in some places than in others, thereby assuming an appearance recalling that produced by the action of cuprate of ammonia. The relatively contracted portions are no doubt signs of the persistence of the cuticle. The same experiments were tried with cotton fibers taken from bleached yarn. These contain much less air, but show sensibly the same appearances as those just described.

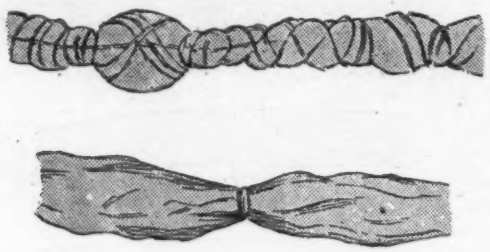


FIG 3
Fibres boiled in strong caustic soda, and then swelled up in cuprate of ammonia.

Fig. 1 shows a mercerized fiber *b* under the microscope. It contains small quantities of air here and there, and the lumen is visible in places as a narrow streak. The swelling of the cell wall on mercerisation extends throughout its whole mass, so that the lumen often becomes obliterated. The fiber *c* shows slight spirals with a double outline. These are not strongly marked, but traverse the width of fiber distinctly. These spirals often lie closer than those shown, and less uniformly. Again regular double spirals are often noted. The outline of these fibers is no longer smooth (compare *b* and *c*). The spirals resemble those produced by cuprate of ammonia, and this seems to show that the cuticle remains after mercerisation. The appearance shown at *c* occurs with many fibers mercerised under the microscope at the ordinary temperature. The structure of the cell-wall can not be clearly made out, even under a power of 300 diameters.

Under the action of cuprate of ammonia, mercerised fibers frequently swell uniformly, and often show cuticular spirals, rarely constrictions. These ring-like appearances occur only in fibers which are protected from various mechanical effects by being in the interior of the thread. We must consider that the resistance of the cuticle to being torn by dilation of the cell wall is lessened by mercerisation, although its elasticity appears to be somewhat increased.

The above researches were repeated with fibers dyed with Diamine Blue 3B. With strong caustic soda lye, the color becomes a very pale violet, and is, in fact, nearly destroyed. The fiber swells up, moves as a result of losing its twist, and gradually develops light spiral markings. If the lye is diluted the blue reappears, and slight barrel-shaped swellings appear, separated by contracted parts, together with spiral folds and streaks. If the cotton is now well rinsed and acted on by cuprate of ammonia, it will be seen that the stripping of the cuticle becomes more distinct, the fiber showing contractions at intervals, which are less distinct than the contractions of ordinary unmercerised cotton, regular swelings of the fiber are often noted, and the cuticle is then readily thrown off or forms spiral bands which wrap round the fiber.

To supplement the above experiment, the action of 28 deg. B. caustic soda lye was observed at zero C. The cotton was subjected to the lye twice for one minute, each time with an intermediate rinse. The appearances produced were such as have been already described. These three experiments have convinced the writer that the cuticle is still present in mercerised cotton.

Cotton wadding was treated under the microscope with sulphuric acid. The wadding was in its usual air-dried state, and was placed in a 1 per cent. solution of Aceto Purpurine 8 B. In five or ten minutes the cotton had absorbed the dye, become pink, and left the field colorless.

Under these conditions only the cuticle is dyed. By allowing a little sulphuric acid to get under the cover glass, we can observe the effect on the fiber of somewhat dilute acid.

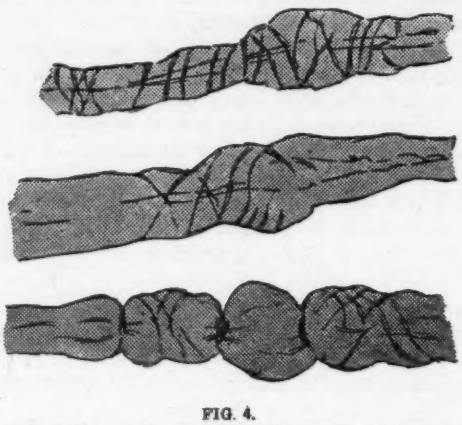


FIG. 4.
Mercerised fibres after treatment with cuprate of ammonia.

It dissolves very rapidly in the concentrated vitriol, but in the dilute acid dissolves slowly, first swelling up and uncurling. During this process the cuticle comes away in the form of pink or yellowish pink fragments. When the acid acts very slowly the fibers swell up uniformly, and show their foliated structure. Practically the same effects are manifested when the acid acts on the mercerised cotton—another proof that it has retained its cuticle.—*W. M. Minajeff in the Zeitschrift fur Faben Industrie.*

(*To be Continued.*)

CHEMICAL TESTS WITH ACIDS AND ALKALIES.

The most important fact revealed by the aid of chemical tests is that animal fibers can be dissolved by alkalies, which have no injurious action upon those of vegetable origin. Acids, on the other hand, have only a slightly destructive action upon real silk, and do not in the least affect wools. Practical advantage is taken of this fact in the recovery of wool from rags and mixed fabrics. These are immersed in weak solutions of sulphuric acid, dried, and beaten by machinery, when cotton and other vegetable substances fall away as powder or dust, leaving the wool uninjured and ready for remanufacture.

We should unite to help our country and ourselves and not to harm each other or to wrong any one.

SOUTHERN COTTON MILL STOCKS.

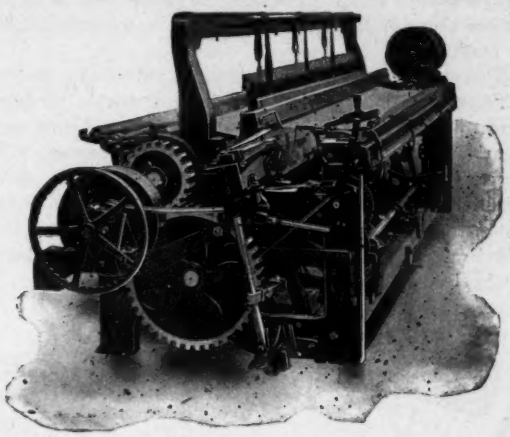
Quotations by F. C. Abbott & Co.,
Charlotte, N. C.

	Bid	Asked
Aiken Mfg. Co.		91
American Spinning	148	
Arkwright Mills	112	...
Arlington	165	...
Avondale		...
Augusta, Ga.		71
Bonnie	121	...
Bloomfield		118
Brandon Cot. Mills	120	...
Brookside		151
Capitol City, pref.		96
Clara	180	...
Clover	150	...
Clinton	138	
Clinton, pref.		103
Cliffside		160
Chiquola Cot. Mills	124	...
Cherokee Mfg. Co.	150	...
Converse	112	117
Dallas Mfg. Co., Ala.		100
Dillon	68	...
Efird, N. C.	133	...
Emira, pref	100	101
Eagle & Phoenix		137½
Easley		150
Edenton, N. C.		...
Exposition		...
Fairfield		78
Florence, N. C.		136
Gaffney Mfg. Co.		77
Gaston		196
Gainesville	50	57
Gibson	100	101
Graniteville, S. C.		165
Gray Mfg. Co.	125	...
Grendel		119
Greenwood	97	...
Highland Park	167	...
Hartsville pref.	100	...
Hartsville		...
Inman Mills S. C.	101	107
Kesler		140
Jno. P. King Mfg. Co.		99
Lanaster, com	117	...
Lanett		...
Langley Mfg. Co.	96	...
Linden, N. C.		125
Limestone		150
Loray, pref 1901		98
Lowell	190	...
Mooresville, N. C.		186
Lumberton		198
Mills Mfg. Co.	100	102
Modena Mills		...
Mollohon		...
Monarch, S. C.	100	104
Newberry		146
Nakomis N. C.		156
Olympia, 1st		67
Ozark		151
Patterson		150
Piedmont Mfg. Co.	176	...
Pelzer	169	...
Pell City, com		95
Pell City, pref.	100	...
Saxon		...
Sibley, Ga.		65
Social Circle		99
Spartan Mills		...
Springstein		...
Statesville Cot. Mills		111
Trenton, N. C.		...
Tryon, N. C.		143
Tusacrora	115	...
Tucapau, S. C.	200	...
Toxaway		93
Union Buffalo, 1st pref.		55
Union Buffalo, 2d pref.		19
Victor Mills, S. C.		128½
Warren Mfg. Co.	80	...
Washington Mills	22	26
Washington Mills pref.		112
Watts		107
Wareshoals		52½
Whitney		125
Wiscassett		125
Woodside	107	...
Woodruff	130	...
Williamston	105	111

The price of any commodity is fixed by the laws of supply and demand.

"L" MODEL LOOM.

The Draper Co., Hopedale, Mass., believe they build the best broad sheeting loom on the market. It is of heavy, solid construction; it picks the shuttle positively; it is driven from an auxiliary shaft; it has a clutch pul-



ley and band brake; it has an auxiliary shipper rod to allow starting from the hopper end; it has an easy starting motion that allows a one finger shipping action, and it has brackets to support the cloth roll when removing same from loom.

Cotton, wool, silk.—Cut two pieces, boil one in caustic soda, which dissolves the wool and silk, leaving the cotton. Boil the second piece in concentrated hydrochloric acid, which destroys the silk and cotton, leaving wool.

NEW MACHINERY AND TRADE NOTES

AN IMPROVED BALL WARPER.

The Globe Machine & Foundry Co. of Frankford, Philadelphia, Pa., have recently gotten out an improved ball warper for the Proximity Manufacturing Co., Greenville, N. C.

Having sent them a sample machine, which they thoroughly tried out, they stated that it was entirely satisfactory, losing no ends and making all the balls (500 yards) actually the same length, and enclosed an order for twenty three more machines like sample.

In view of the above gratifying statement a short description of the machine may prove of interest to other manufacturers. The creel is of the V type with the well-known electric drop wire stop motion, which rarely allows the end to reach the drop roll. The intermediate frame with drop roller and slow motion has a lead reed operated by a cam for lease taking. The pedestal has the two dial measuring device on it which has recently been improved with a tripping device that makes the stopping at the end of the cut or warp, positive, and the machine can not be started until it has been adjusted for the next cut, or warp.

The baller is driven from the shaft in the intermediate frame by a short chain, and is placed close under the machine, and is so designed that the ball may be rolled directly on the truck. The traverse screw is two and seven-sixteenths inches diameter with one half inch square thread, giving ample bearing and wearing surface. The yarn guide is fitted with rollers so that there is no drag on the yarn and consequently the threads of the warp are all of the same length.

The other lines of warping machinery, the Denn warper, the Denn section warper, and the Denn balling attachments are too well known to need description, though improvements are being added from time to time.

REPAIRS TO COTTON MILL MACHINERY.

There is nothing about the average cotton mill which causes so much annoyance and expense as the continual breaking of parts of the machinery, and notwithstanding the fact that all mills carry a large stock of duplicate parts which experience has taught are most liable to break, representing thousands of dollars, it is inevitable that some parts will break for which no duplicate is carried. The result is that in most mills there are one or more machines idle all the time with a consequent curtailment of production, which, in a busy period, means a serious loss to the mill. In some cases the broken part can be made in the nearest foundry, and only a few days lost, but in most cases it is necessary to order from the manufacturer, and as a large percentage of the cotton mills are located in remote sections of the country it means a loss of production of several weeks. This is especially true of mills in the South, as the machinery in use is almost entirely of Northern man-

facture, and the breaking of a part not carried in stock is a serious matter. Some have tried the experiment of having the castings made in the nearest foundry, but this is very unsatisfactory, as the quality of castings made in the average job foundry are of such a quality that they are not made "in the likeness of anything that is in the heavens above or the earth beneath nor in the water under the earth."

The question of repairing broken castings by the use of "ferrofix" and brazing the joint together is receiving a great deal of attention at the present time, and some very remarkable repairs have been effected by this process. The process was invented in 1900 by a German by the name of Friedrich Pich, and patented in Europe and the United States, the patents being purchased by the American Ferrofix Brazing Co. of Philadelphia, represented in Atlanta, Ga. by Biddell Bros.

MASTER GEAR SEGMENT

Weight, 1500 lbs.

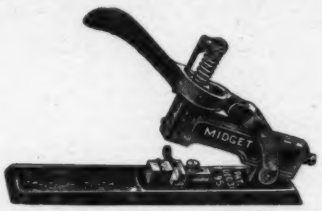
See fracture. Brazed with "FERROFIX." Now in regular service.

It has been demonstrated that any broken casting can be brazed, no matter how delicate, without disturbing the alignment, and that the weight is only limited by the means at hand to obtain the needed heat. It has been necessary, until recently, to send these parts to the nearest brazing plant and have the work done owing to the difficulty of getting sufficient heat, properly applied, in the ordinary forge. But now there is made an outfit which is suitable for setting up in any mill and so constructed that any mechanic can braze a piece in a few minutes, and this brings the process to the point where it is valuable to the cotton mills of the country, and especially of the South.

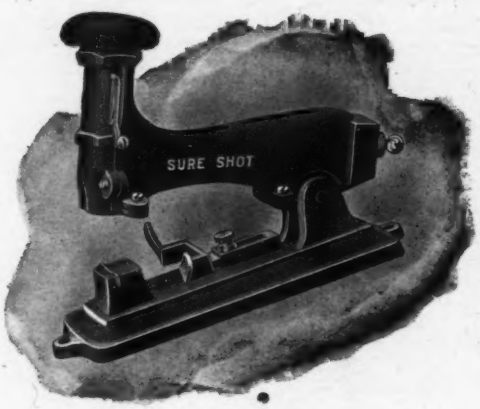
With proper torches and by the use of "ferrofix" and spelter the casting can be brought to the proper heat and the spelter made to unite to the cast iron so that it is impossible to tear the parts asunder, and the casting if broken with a sledge will invariably break in a new place. A large number of cotton mills have these outfits, and it must be that in a short time they will be a necessary part of the mill equipment. Some very important repairs which have been effected recently in Atlanta were the brazing of a "rocker arm" from the engine of the Lanett Cotton Mills, West Point, Ga., weighing 1,000 pounds, and the brazing of an eleven-foot shear for the American Can Co., a 36-inch diameter cut gear broken in five places; a 40-inch diameter rope drive sheave for the Buckeye Cotton Oil Co., broken in seven places; and a steam cylinder cracked the whole length, owned by the Edward O. Miles Co. These were rather more difficult than the ordinary work and will give an idea of the work which is being done. Of course, the brazing of loom sides, swords, crank shafts, ring rails, etc., is a simple proposition compared with these. It would seem that the invention of Friedrich Pich is to be of great value to the cotton mill men of the country now that a suitable torch has been invented which can be conveniently set up and used in the average mill.

AUTOMATIC STAPLING MACHINE.

Midget Novelty Company, 636 West 44th St., New York. We have been using this company's automatic stapling machines and staples with much satisfaction for binding correspondence, vouchers, slips, etc., that form a part of our office work. These machines, however, can be used for other purposes and are already in use in many of the largest cotton, woolen and silk mills, at home and abroad, and in wholesale houses. These machines are automatic in action and guaranteed by the maker. They form a neat and economical method for binding and ticketing papers and samples of all kinds. Over 160 are used in the United States Government Departments at Washington, D. C. The company requests an opportunity of demonstrating the effectiveness and economy of its system and will upon the re-



Stapling Machine "Midget."



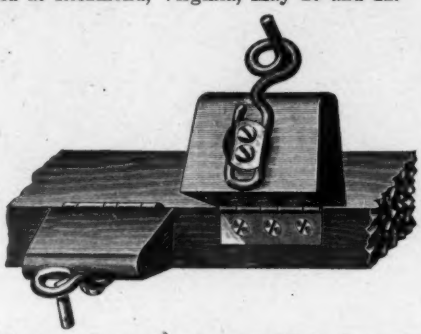
Stapling Machine, "Sure Shot."

Stapling Machine, "Acme No. 1."

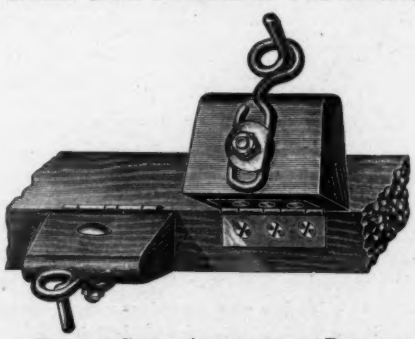
ceipt of an order forward a machine and box of staples with the privilege of returning them within ten days if not found satisfactory. In order that our readers may have a better idea of the device we give, herewith, three illustrations of it, in as many forms, showing its uses. The "Midget" machine is especially adapted for papers and desk use, but is also largely used for fastening laces, embroideries, neck wear, etc. The "Sure Shot," employing larger staples, is adapted for heavy paper work, and for ticketing or binding samples of textiles, carpets, cardboard, leather, etc. The "Acme No. 1" is a larger and more powerful machine than "Sure Shot." It has a lever action that is of special advantage to large users of staples. The last two machines, under the name of "H and L," use fine wire, pointed staples, and are just the thing for hosiery, underwear, woolens and worsteds.

AN ADJUSTABLE THREAD GUIDE.

Southern manufacturers should be interested in the adjustable thread guide manufactured by The I. E. Palmer Co., Middletown, Conn., which was exhibited by their representative at the American Cotton Manufacturers' Convention held at Richmond, Virginia, May 20 and 21.



THREAD GUIDE ATTACHED BY TWO SCREWS.



THREAD GUIDE ATTACHED BY BOLT.

This guide has been adopted by some of the largest mills in New England and the South. Practical spinners have found it difficult to adjust the old screw guide, and it is conceded to be advisable whenever guides are changed to adopt a guide that can be adjusted to a needle point, and readily applied to the wooden clappers at a relatively small cost. When once applied, they are there to stay, as they can not be moved from their fixed position by the operator.

One of the largest mills in the South ordered 1,000, and was so impressed with the improved running of the spinning that it at once gave an order for 5,000 more, followed by an order for 10,000, and before these were all applied they gave an order for 111,880 more, having been thoroughly convinced that they could not afford to run even a print cloth mill with guides not properly adjusted.

The guide is patented in the United States, Canada, England, Germany, France, Belgium and Japan. It is well worth the consideration of manufacturers to supply the sides operated by one or two spinners and thoroughly test its merits.

JACOB J. ALTEMUS, Philadelphia. This well-known maker of textile machinery is now offering a machine constructed specially for the purpose of rewinding yarns to get a greater amount of yarn on the shuttle bobbin so as to obtain greater results from the loom at a less cost. Claims made for this machine among others are, high speed without injury to the yarn, hard-wound bobbins in every part and of uniform size, greater amount of yarn on the bobbin and a lower cost of production. The maker is willing to place a machine in a mill on approval for the purpose of testing out its merits and claims.

FRED FRANKE & COMPANY, Louisville, Ky. This company has brought out some new inventions in baling presses for baling all balable materials. Their newly-invented clothing and other presses have stood the test of time.

STANDARD MACHINE COMPANY, Philadelphia. This company manufactures seamless hosiery machines for which it has received the highest awards at expositions where it has been shown. Its Standard "F" may be particularly noted as being more completely automatic than what this term usually applies. This machine performs all of its functions automatically, and has the company's exclusive positive needle movement by which there is obtained a comparatively high speed on the heel and toe. This machine has another feature which automatically throws back the yarn carrier, doffs the fabric from the needle, levels the needle and stops the machine, leaving the machine automatically in instant readiness for transfer of the rib top. The mechanical transfer device is simple in construction and operation, easily understood by the average help. This machine is built in all sizes and gauges and half-hose and hose can be knit on the same machine, and the small diamter being especially adapted for knitting children's and misses' hosiery.

THE COTTON FIBER—By Dr. F. H. Bowman, published by Macmillan & Co., New York and London. A new and revised edition of Dr. Bowman's standard work on the structure of the cotton fiber, in its relation to technical applications, has just been published. This work has been regarded since its first appearance in 1881, as without a peer pertaining to the cotton fiber in its special application to its manufacture. It covers such topics as the history, sources and botany of cotton; origin and development of the fiber; chemistry of the fiber; strength and variation in fibers; strength and testing of yarn; theory of dyeing; relation of the fiber to the dyeing process; and the methods of analysis and detection of the various fibers. The work is fully illustrated, chiefly with graphic sketches, which were preferred by the author, as the typical distinctions which he desired to emphasize are only to be found in single fibers which are mixed in the lint with thousands of others, and which photography can not select or show to the same advantage, although clearly perceptible to the eye. These graphic views are the best that we have ever seen

in any published work on cotton, and are particularly good for educational purposes. The scope of the work is the fiber itself, and its relation to the various processes of manufacture, both mechanical and chemical, rather than the methods employed in manufacture, the object being to summarize the distinctive character of the raw material, upon the nature of which all the changes in the process of manufacture must be based if the best results are to be obtained. The author, when dealing with the question of dyeing, confines his inquiry to the method in which the fiber lends itself to the reception of the dye rather than the methods employed to dye it. The price of the book is $2.75 and can be obtained of the Cotton Publishing Company, Atlanta, Ga.

RICHARD J. ALLEN. Mr. Allen has resigned his position of secretary of the Manchester Cotton Association, Manchester, England, and has taken the position as master and secretary of the Manchester Royal Exchange of the same city.

THE LUNKENHEIMER COMPANY, Cincinnati, Ohio. We are in receipt of the 1908 catalogue of this company, and we may say that the company is willing to send the book free of charge to any one interested in its line of manufacture. This catalogue illustrates and describes this company's manufactures consisting of iron and brass valves, whistles, clocks, gauges, injectors, lubricators, oil and grease cups, etc., adapted to the requirements of all classes of machinery. This company makes so many specialties that it is impossible for us to mention even a small portion of them, and for this reason we would suggest that any one interested in such appliances should write for the catalogue which is really a book of 564 pages, and is an ornament to any office library.

NEW TWENTIETH CENTURY DOUBLE ACTING RIBBERS FOR UNDERWEAR AND HOSIERY.

After many years of experimenting, by a master stroke of knitting machine invention, one of the greatest circular ribbed knitting machine improvements made in the last quarter of a century has now been completed and patented. The machine has been tested for nearly two years and all objections overcome. While the belt does not travel any faster, or the bobbins or cams revolve any faster, or are there any more or less feeds or cams than on ordinary machines, yet, it is claimed, it will knit twice the number of yards of fabric as any other style of ribbed machine. Or in other words, it is said, ten of these machines will produce the same quantity of yards, or dozens, that it has heretofore taken twenty machines to produce, thus making a saving to the manufacturer of floor space and power, and operating expenses. James Taylor, 121 Arch St., Philadelphia, Pa., whose brother, H. B. Taylor, is the inventor, has the U. S. patents for this machine and has applied for patents in several foreign countries. The United States patent has been allowed under date of March 30, 1908, serial No. 317,660, filed May 19, 1906. Mr. James Taylor is offering these patents for sale, but if not sold shortly he contemplates making arrangements to build and place them on the market.

GEORGE OTIS DRAPER.

At the last meeting of the board of directors of the Draper Co., Hopedale, Mass., the following resolutions were unanimously adopted:

GEORGE OTIS DRAPER.

"George Otis Draper, who has been associated with us as director and who has been secretary of the company since its formation, having resigned because of ill health, we desire to place on record this statement of our regret because of his resignation and our appreciation of his services.

"He has been an important factor in our success; an able advisor; an efficient executive, and uniformly courteous in his dealings. We feel that we have sustained a distinct loss through his resignation."

George Otis Draper has had charge of the advertising and literary products of the company, and its predecessors, since his connection with the firm of George Draper & Sons, in 1889. He has also served as a member of important committees during this period, and has given special attention to matters pertaining to patents.

J. W. Brock of the Standard Fibre Co., Somerville, Mass., was a welcome caller at COTTON'S Atlanta offices --April 23. His company, after exhaustive and expensive tests, placed on the market the only seamless fiber roving can manufactured. The can on account of its lightness and almost undestructable qualities has met with an enormous sale. Many thousands have been sold in New England mills and many orders are now being received from the South.

The cotton growing industry is potential to make the South the richest country in the world.